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Rama Shastri
Eclipse cult in the
Vedas, bible and
the Kuran.



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PREFACE.

It needs no demonstration that the Vedic ritual begins with sacrifices on new and full moon days with an Upavasatha or fast on the 14th and 29th lunar days and that the cycle of five lunisolar years known as Samvatsara, Parivatsara, Anuvatsara, Idvatsara, and Idāvatsara with two intercalary months is one-fourth of the big cycle of 19 to 20 lunisolar years with eight intercalary months. This cycle is called Ayodhyā, the City of Brahma, Yasas and other Gods with eight Chakras or enclosures. With a view to distinguish the eight intercalary months from ordinary months the Vedic poets gave different names to the solar deities that were supposed to preside over these intercalary months. The names are (1) Dhāta (2) Aryama (3) Mitra (4) Varuṇa (5) Amśa (6) Bhaga, (7) Indra and (8) Mārtāṇḍa. Detecting the mistake they made in assigning eight intercalary months to the cycle of twenty years, they cast out the eighth month along with Mārtāṇḍa, its deity, so named because he was imperfectly born or still-born. These eight deities are known as Aditi's sons, of whom six were born as twins, and the seventh single-born, the eighth being cast out as Mārtāṇḍa, still-born. The reason for extending the five-years' cycle to the cycle of 19 to 20 years lies in the exact adjustment of the lunar year with the solar year in the course of nineteen years. This is clearly the meaning of the Rigvedic statement that Dhāta, the solar deity of the first intercalary month, set the sun and the moon aright as before. The use of the word 'Akalpayat' in the passage is very significant. It implies a definite

period called 'Kalpa' which by the time that Amara-simha composed his Nāmalingānuśāsana and Sri Kṛishṇa sang the Bhagavadgītā came to mean a Day-kalpa and a Night-kalpa of 1000 Yugas each, at the end of which Dhāta is supposed to create the world with sun and moon together as before. This simple Kalpa of 7000 days equivalent to 19 years, or 14000 days equivalent to 38 years to include both the day and night Kalpas became a huge Kalpa of 2000 Divya Yugas of 4,320,000 years each in the Purāṇas and astronomical Siddhānta works. The birth of seven full-born sons with one still-born son is given expression to in the Rig. verse "Sākanjānām Saptathamahurekajam."

In effecting this cycle of seven son-like suns called "Adityas" presiding over the seven intercalary months, Nature seems to have provided the Vedic poets with a safe check. It is a cycle of three solar and lunar eclipses, preferably lunar, called Paṭara, Viklidha, and Pinga in one thousand days, as expressly stated in the Tait. Aranyaka. This cycle of 1000 days is extended to seven thousand days equivalent to 19 solar years or 19 lunar years with 7 intercalary months, for the reason that it is a recurring cycle of eclipses and that the same eclipse that marks the beginning of the cycle re-appears not merely at the close of 18 years and 11 days but also at the end of nineteen years, when Dhāta sets the sun and the moon together aright as before. At the time we are speaking of, the node seems to have been so situated as to mark the close of the Vedic lunar year about ten or twelve days before the solar year. Accordingly there was a solar or lunar eclipse according as it was a new moon or full moon when the sun arrived at the node. The ten

days are described as ten lifting machines to take up the sun or the moon from the depths into which he had fallen. Other metaphorical descriptions of these ten days are pointed out in the second Chapter of this book.

(3) In the Vedas eclipses are variously described: it is a war between the Devas or spirits of light, and the Asuras, the demons of darkness, or it is a cow-raid in which the calves of the sun-cow are carried away and impounded in the cave of the seven hills, or it is a kindling fuel, there being no more than twentyone fuels; likewise there are no more than twentyone cows; or it is twentyone milky streams.

This cycle of three eclipses in 1000 days described as three cows or three milky streams (in the case of lunar eclipses) is referred to in Sāmaveda VI, 2,2 and II 1,7,3.

(4) The cycle of 7000 days is also called Sapta-Purusha cycle, each Purusha measuring a thousand days (M.S. I, 10, 8.) The Tait. Aranyaka restricts the number of Purushas to seven.

(5) In Rig. IX 10, 11-12 the cycle is described as a thousand-branched world with seven Faries engaged in weaving seven Paridhis or enclosures.

(6) The Purushasūkta assigns to Purusha (measuring 1000 days) seven Paridhis or enclosures and thrice seven kindling fuels.

The vedic gods are thus safely kept within the Ayodhyā (impregnable) city with these seven (originally eight) Chakras or enclosing walls. The eclipse gods, Indra and Krishna named also Yasas, have their abode in this city.

The same city is also described as a Chamasa, Soma-cup (The sky) kept bottom upwards and Yasas is said to have his seat in it. (A.V. X. 8, 9)

It is also called an Asvattha or Pippala tree with its root in the sky and branches spread over the world below. This city is assailed six times in every thousand days by Sambara, Vritra and other demons of darkness. It is to avert the wrath of these demons that sacrificial offerings are made to Kubera (Ku-Phero), the chief of the demons.

It is on this very ancient eclipse-Cult that the myths, parables and tales of the world hang. It is this cult that has given rise to the Epic and Purāṇic tales of India, as pointed out in this book. It is this world-wide eclipse-cult that has given rise not only to the Vedāntic, Purāṇic and Tāntric religions of India, but also to the Biblical religion of the Israelites, as explained in this work.

In conclusion I feel happy to express my thanks to Mr. J. N. Krishna Iyengar, M.A., for going through the proofs. My heartiest thanks are due to Pandit Kāśinātha Śāstri, the Proprietor of the Sri Pāṇchāchārya Electric Press, for his kindness in expediting the work and the neat get-up.

Mysore, }
31-5-1940. }

R. Shamasastri.



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To take another example :—

भस्मोद्धूलन भद्रमस्तु भवते रुद्राक्षमाले शुभं
 हा सोपानपरम्परां गिरिसुताकान्तालयालङ्कृतिम् ।
 अचाराधनतोषितेन विभुना युष्मत्सपर्यासुखा-
 लोकोच्छेदिनि मोक्षनामनि महामोहे निधीयामहे ॥

“Goodbye, O ashes, with which I besmeared my body every day ; goodbye, O rosary of Rudrāksha beads, which I used in contemplating on the names of Siva ; I am sorry for you, O series of steps leading to the door of the temple of Siva, the consort of the Himalaya's daughter. For I am just being thrown by the lord pleased with my devotion into the dark cell called Moksha which puts an end to the happiness of seeing you all again.”

Here the attainment of emancipation is the cause of not seeing again the ashes, rosary, and pilgrimage to the temple. The effects are spoken of, while the attainment of emancipation, the cause, is only implied.

In the same way the Vedic description of the appearance of the dawn again for a second time after sunrise in Rig. 3, 39, 3 implies the occurrence of a total or nearly total eclipse of the sun causing the reappearance of darkness together with the dawn and the Aśvins. Prof. Max Muller's translation and notes on the verse are as follows :—

“The mother of the twins has borne the twins : the tip of my tongue falls ; for she approaches ; the twins that are born assume form—they, the conquerors of darkness that have come at the foot of the sun.”

"We might have guessed from the text itself, even without the help of the commentator, that the mother of the twins here spoken of is the dawn. But it may be stated that the commentator, too, adopts this view."

"The time of the Aśvins is by Yāska supposed to extend to about sunrise; at that time other gods appear and require their offerings, and first of all, Ushas, the dawn. Here, again, a distinction is made between the dawn of the air and the dawn of the sky, a distinction which it is difficult to understand."

The only way to understand the distinction is to take the dawn of the air as the natural dawn that appears before sunrise, and the dawn of the sky as that brought about by the darkness caused by a total or nearly total eclipse of the sun. The appearance of the Aśvins is a decisive proof of its being a total eclipse. Apprehensive of calamities to the world which the eclipse portends, the poet feels inability to give expression to it. Hence he says that the tip of his tongue falls. In the same way the description of the reappearance of the dawn after sunrise in Rig. 1, 6, 1-3 implies a solar eclipse. The verses are as follows:—

युञ्जन्ति ब्रह्मरूपं चरन्तं परितस्थुषः । रोचन्ते रोचना दिवि.—

I. 6, 1.

युञ्जन्ति महान्तं अरोचमानं दिवि चरन्तं परितः तस्थिवांसो देवा वा लोका वा । रोचन्ते च रोचनानि नक्षत्राणि इन्द्रतेजसा सन्धुक्षितानि—एष वा इन्द्रो य एष तपति । शत. ब्रा.—II. 3, 4, 12.

अरुषः अरोचमानः—असौ वा आदित्यो ब्रह्मः । तै. ब्रा.—

III. 9, 4, 1.

युञ्जन्त्यस्य काव्या हरी विपक्षसा रथे । शोणा धृष्णू नृवाहसा ।
 अस्य रथे कमनीयौ अश्वौ सव्यदक्षिणयोः पार्श्वयोः युज्यमानौ शोण-
 वणौ धर्षकौ नेतुरस्य वोढारौ । पूर्वपक्षापरपक्षौ इन्द्रस्य हरी ॥

केतुं कृण्वन्नकेतवे पेशो मर्या अपेशसे । समुषद्भिरजायथाः ।
 सहाय्यं तृतीया । वसेर्निवासार्थादुषाः उषस एव तथोक्तमाश्चर्यम् ।
 मर्त्यानां प्रज्ञापयितुं तेषामामन्त्रणं मर्या इति । कृण्वन्नकेतवे प्रज्ञारहिताय
 स्वपते जनाय प्रबोधनेन । केतुः केततेः प्रज्ञापनार्थात् । तथा अपेशसे
 पेशः कृण्वन् तमसा तिरोहितरूपाणां तेजसा रूपं ज्ञायते ।—

रात्रौ स्वपतो गतप्रज्ञस्य प्रज्ञोदयं कुर्वन् तमसा तिरोहितरूपाणां
 गवादीनां रूपं च ज्ञायते केतुं कृण्वन् प्रज्ञानरहिताय पेशश्च अपेशसे ।
 समजायथाः त्वमुषोभिस्सह तस्मिममाश्चर्यं मनुष्याणां निवेदयितुं
 सम्बोधयति मर्या इति.—

“Those that stand around the great sun who is devoid of lustre and who is moving in the sky yoke (the horses); the stars lit by Indra shine.”

Com.—Indra is he who is glowing above ; Arusha means devoid of light ; Bradhna means the sun. 1

“They yoke beautiful, strong, and red horses to his chariot to carry him on.”

Com.—The light and dark halves of the month are Indra's horses ;2

“O men, bringing cognition to the cognitionless and colour to the colourless Indra (the sun) came in contact with the dawn ; it is a wonder.”

In the first verse not only is the sun said to be devoid of lustre ; but also the stars are said to be shining ; this in itself is a sure proof of a solar eclipse. In verses 3 men are addressed to see the wonder. After rising, the

sun can not come in contact with the dawn unless it is an eclipse. Hence it is a wonder.

In the same way in Rig. 1, 7, 3 Indra is said to have raised the sun to the sky and let loose the cows (rays of light) from the hill (hill-like eclipse). The verse runs as follows :—

इन्द्रो दीर्घाय चक्षसे आ सूर्यं रोहयद्विवि । वि गोभिरद्रिमैरयत् ॥

I. 7, 3.

“ Indra raised the sun to the sky so as to be seen by all ; he let off the cows from the hill.”

Likewise in Rig. 1, 32, 4 Indra is spoken of as having raised the sun and the dawn together to the sky at the time of his fight with Vritra and his followers. The verse is as follows :—

यदिन्द्राहन्प्रथमजामहीनामान्मायिनाममिनाः प्रोतमायाः । आ-
त्सूर्यं जनयन्द्या मुषसं तादीक्षा शत्रुं न किला विवित्से । I 32. 4.

यदेन्द्र हतवानसि प्रथमजामहीनां यदा च (तदनन्तरं)
तत्सहायानां मायावतां मायाः प्रकर्षेण हिंसितवानसि (तदनन्तरं)
अहिना तिरोभूतं सूर्यं द्यामुषसं च प्रादुर्भावयन् त्वं तदानीमेव
जगति न कं चन शत्रुं हतशिष्टमन्वविन्दः ।—

“ When O Indra, you slew the first born of the serpents and blew off the illusions of his followers who were skilled in causing illusions, and raised the sun and the dawn together to the sky, then, you knew no enemies.”

Here the commentator interprets “ Tādītā,” to mean “ tadanantaram, thereafter.” But really the words “ Yad and tādītā ” mean “ at the time when.” The verse implies that the two acts, Indra's slaying Vritra

and his raising the sun and the dawn together to the sky, were synchronistic. In other words it means that when he was fighting with Vritra, the sun was covered with darkness and the dawn was visible.

The same idea is still more clearly expressed in Rig. 1, 33, 8-10 as follows :—

चक्राणासः परीणाहं पृथिव्या हिरण्येन मणिना शुभमानाः ।

न हिन्वानासः तितिरुस्ते इन्द्रं परिस्पशो अदधात् सूर्येण तान् स्पशः ।

I 33, 8

कुर्वाणा आच्छादनं महत्तया पृथिव्या हिरण्येन अलङ्कारेण शोभमानास्ते इन्द्रं प्रति गच्छन्तः न तीर्णवन्तः । सोऽयं सूर्येण सह परितो रश्मीन् निहितवान् ।

न ये दिवः पृथिव्या अन्तमापुर्न मायाभिः धनदां पर्यभवन् ।

युजं वज्रं वृषभश्चक्र इन्द्रो निज्योतिषा तमसो गा अधुक्षत् ॥

I. 33, 10.

याः आपः दिवः पृथिव्या अन्तं नापुः न कर्मभिर्धनस्य दातारं इन्द्रं परितो अभवन् । तेषां जयार्थं सहायं वज्रं वर्षिता इन्द्रश्चक्रे ततो ज्योतिषा गाः आपः तमसो मेघात् निरधुक्षत् दस्युं हत्वा.--

When those demons shining with golden beads covered the broad earth and failed in their attempt to reach Indra, then Indra put up the sun and flooded the world with light ; when those waters unable to reach the end of the earth only stood around Indra, then Indra applied his thunderbolt and let loose the cows with light from darkness.

Here the yellow beads of the demons indicates a red eclipse and the iron thunderbolt in Rig. I. 52, 8 implies a black eclipse. Eclipses are classified to be of three colours, gray, black, and yellow, as will be shown later on.

In these verses neither a mountain nor a cloud is mentioned; but only darkness (Tamas). What else can this be if not an eclipse?

Likewise in Rig. 1, 51, 4 Indra is stated to have removed the obstruction to waters, obtained the wealth of the demons hidden in the mountain, and slain the serpent-like Vritra with all his might. At the same time he is said to have raised the sun to the sky so as to be visible to all.

त्वमपा मपिधाना वृणो रपाधारयः पर्वते दानुमद्रसु ।

वृत्रं यदिन्द्र शवसा वधीरहिं आदित्सूर्यं दिव्यारोहयो दृशे ॥

त्वं मेघस्थानामपां अपिधानानि अपावृणोः । तथा
शिलोच्चये असुरसम्बन्धि वसु धृतवान् मेघे वा । वृत्रं यदिन्द्र वलेन
अवधीः अहिं अनन्तरमेव सूर्यं दिव्यारोहयः सर्वेषां दर्शनाय ।

"O Indra, thou hast removed the obstruction to waters; thou hast secured the wealth of the demons concealed in the the hill or in the cloud; when thou hast slain Vritra, then the very next moment thou hast raised the sun to the sky for all to see."

Here if the clouds were taken in the sense of raining clouds, then how could Indra make the sun visible to all? If Vritra were taken in the sense of an eclipse, there would be no such difficulty. Likewise in Rig. I 52, 8 Indra is said to have raised the sun to the sky so as to make him visible to all. The verse is as follows:—

जघन्वां उ हरिमिः सम्भृतक्रतविन्द्र वृत्रं मानुषे गातुयज्ञपः ।

अयच्छथा बाह्वोर्वैज्रमायसमधारयो दिव्यासूर्यं दृशे. I. 52, 8.

जघन्वानश्चैस्सम्भृतप्रज्ञ वृत्रं मनुष्यार्थमपो गमयितुमिच्छन् ।
अग्रहीर्वाह्वोरायसमायुधम् । अथ तं हत्वा सर्वेषां दर्शनाय दिवि
सूर्यमधारयः ॥

"O wise Indra, when with thy horses thou hast slain Vritra desirous of supplying waters (light) to men, when thou hast taken up the iron thunderbolt with thy arms, then thou hast raised the sun to the sky for all to see."

Here the concurrence of the two acts, Indra's slaying of Vritra and his raising the sun so as to be visible to all, is an indisputable evidence of a solar eclipse. From this it follows that Vritra is the cloud-like or mountain-like shadow covering the sun and that Indra is an eclipse-god residing in the sun at the moment to release him from the coils of Vritra.

In Rig. 1, 54, 9 the dark mountain is said to lie in the belly of Vritra obstructing the flow of waters (streams of light) as follows :—

अपामतिष्ठद्धरणहरं तमोऽन्तर्वृत्रस्य जठरेषु पर्वतः । अहि-
मिन्द्रो नद्यो वविणा हिता विश्वा अनुष्ठाः प्रवणेषु जग्नते—I. 54, 9.

अपामतिष्ठत् धारकगह्वरयुक्तं तमः । एतदेवाह—वृत्रासुरस्य जठरे
मेघोऽतिष्ठदिति । अभिजग्नते एनं पर्वतं वारकेण मेघेन निहिता विश्वा
नदीरनुतिष्ठन् प्रवणेषु इन्द्रः ॥

Obstructing the flow of waters, the darkness that is the mountain lay in the interior of Vritra's belly ; by Indra, the slayer of Vritra, the streams thus obstructed were let loose to flow in low grounds.

In the above verse the word "Tamah" means darkness, and not the adjectival sense dark. It is used to qualify the word "Adri" mountain. In such cases one noun is taken to imply "its like." Accordingly "Adri tamah" should be taken to mean mountain-like darkness.

In Rig. 1, 55, 6 Indra is praised for destroying the cities of the Asuras, demons, and for creating light without thieves. The verse is as follows :—

स हि श्रवस्युः सदनानि कृत्रिमा क्षया वृधान ओजसा विनाशयन् । ज्योतींषि कृण्वन्नवृकाणि यज्यवे वसुक्रतुः सर्तवा आपः सृजत् ॥

स ह्यन्नसिच्छन् असुरपुराणि कृत्रिमाणि ओजसा विनाशयन् भोगसाधनभूतया पृथिव्या वर्धमानः ज्योतींषि कृण्वन् स्तेनवर्जितानि यजमानाय अवसृजति सरणाय उदकानि । यदा वै प्रत्यक्षं भवत्येष इत्याचक्षते । यदा वै परोक्षमथ स इति, इति ब्राह्मणम् ॥

“He, Indra, desirous of securing food, grew in might destroying the illusory cities (Kshayāh) of the demons, and procuring light without thieves, he let loose the flowing waters (light) for the sacrificer.”

What the cities really mean will be explained in connection with the sun's war with Śambara. Here the two acts, the destruction of the cities and the creation of light, are stated to be synchronistic. The thieves are the shadow of eclipse covering light, which is compared to wealth and waters. The commentator says that the use of the pronoun “sah” in the above verse indicates that the event was a past one; and quotes a Brahmanic passage to the effect that the word “eshah, this” refers to what is under observation and the word “sah” refers to a past event.

In Rig., 1, 56, 4 Indra is stated to disperse darkness in his battles, as follows :—

देवी यदि तविषी त्वाऽवृध ऊतये इन्द्रं सिक्कत्युषसं न सूर्यः ।
यो धृष्णुना शवसा वाधते तमः इयर्ति रेणुं बृहदहर्हिरिष्वणिः ॥

दैवं यदि बलं त्वां वर्धयत् तव रक्षणार्थं इन्द्रं सेवते उषसमिव सूर्यः । य इन्द्रो धृष्णुना बलेन सङ्ग्रामस्थं तमो बाधते स इन्द्रः, हे स्तोतः, त्वदर्थं सङ्ग्राममागत्य महद्रेणुमुत्थापयति शत्रूणां हरणशीलस्वनः ॥

"If for thy protection, O sacrificer, divine power supports Indra, just as the dawn supports the sun, then Indra who with his might disperses darkness in his battles comes with his destructive roar and raises clouds of dust for thy sake."

There is no need to state that dust and darkness referred to in the above verse is the eclipse shadow.

Credit for the destruction of Vritra is given not only to Indra, but also to Agni Vaiśvānara in Rig. 1, 59, 6 as follows :—

प्र नू महित्वं वृषभस्य वोचं यं पूरवो वृत्रहणं सचन्ते ।

वैश्वानरो दस्युमग्निं जघन्वां अधुनोत्काष्टा अव शम्बरं मेत् ॥

प्रब्रवीमि तन्महित्वं महाभाग्यं वर्षितुरपाम् । यं पूरयितव्या मनुष्या मेघ हनं सेचन्ते वर्षाकामाः । वैश्वानरोऽग्निः उपक्षपयितारं घ्नन् अवाधुनोत् काष्टा अपः । अवाभिन्नच्च मेघम् ॥

"I proclaim the greatness of the bull-like Agni whom the Purus worship and praise as the slayer of Vritra. That Vaisvanara who destroying the obstructor sent the water (light) to all the quarters tore Śambara to pieces."

It is to be noted that it is the sum that is called either Indra or Agni Vaiśvānara. The acts of Indra and other gods are sometimes described as human and at other times as aerial. In some places Indra is described to be fighting like a bull with another bull for the

possession of a cow to be impregnated. This idea is clearly expressed in Rig. 1, 32, 7, as follows:—

अपादहस्तो अपृतन्यदिन्द्रमास्य वज्र मधिसानौ जघान ।

वृष्णो वधिः प्रतिमानं वुभूषन् पुरुत्रा वृत्रो अशयद्व्यस्तः ॥

हस्तपादवर्जितोऽपि इन्द्रमपृतन्यत् । आजघानास्य उच्छिन्ते देशे
वज्रमिन्द्रः । वर्षितुर्वृषभस्य छिन्नवृषणः प्रतिद्वन्द्वीभवितुमिच्छन्—
इत्यौपमिकम् । अनेकेषु देशेषु वृत्रोऽशयत् शकलीकृतः ॥

“Adhisānu means a high pinnacle.....it means here the organ between the thighs. One who is deprived of his generative organ is desirous of becoming a rival to one who has that organ. Here a bull is an object of comparison and the subject of comparison is Vritra. The verse means this:—“Though devoid of hands and legs, he opposed Indra; the latter struck him on the organ between his thighs; though devoid of his organ, yet desirous of becoming a rival to Indra with sound organ, Vritra opposed Indra. Struck by Indra and torn to pieces, Vritra lay down.”

Here the idea of double seed during eclipses is hinted. Birth on the occasion of eclipses is considered as the result of a double seed. To avoid this, libations are given to Agni in Śrāddha rites with prayer to Agni to cut off double seed.

In Rig. 1, 6, 4 the Maruts are said to be impregnated for the creation of the world. They are also said to be seven in number and each of them is also said to have a thousand troops in Kr. Yajurveda III, 4, 2, and Rig. VIII, 41. In 1, 6, 5 they are said to take Indra to the cave for recovering the cows (light). As will be presently

shown, the Vedic poets counted three eclipses in each half of one thousand days made up of three eclipse-years of 330 to 346 days. The eclipse days were regarded as the season of creation. The number 1000 is called an Indriya, vital power of seed. The total number of such powers or Indriyas are fixed to be seven. The Maruts, the bearers of the seeds, are also seven. Hence the Maruts with their troops of 1000 each come to 7000 in number. This is the number of days of a cycle of eclipses called Metonic cycle, which, as will be seen, is really Vedic as well as Biblic.

In Rig. 1, 54, 5, Indra is stated to cause the stream of water to fall over the scorching or scorched head of the sun, as he did before. Here two important facts are implied. One is Indra's act of causing the fall of water, that is, the spread of light, which is cyclic; and the second is the implication of spread of light by Indra's striking the cloud-like eclipse. In verse 6 of the same hymn Indra is said to have destroyed the 99 cities of the enemies, while rescuing Etasa (the sun) and his chariot. In Rig. 1, 61, 7 Indra is said to have eaten the sacrificial food and drunk Soma by force; He is also said to have slain the boar and crossed the hill for securing the wealth of the demons. In his commentary on the verse Madhava quotes a Brāhmaṇic passage and says that the word "Adri" here means seven hills of the Asuras containing their wealth. (Saptānām girīṇam parastāt vittam vedyam asurāṇām bibhartīti Brāhmaṇam.) Adri is sometimes taken to mean a cloud and at other times a real hill containing cows or wealth.

The commentators take the word "Adri" to mean a hill or seven hills when it is used in connection with

"gāvah" cows, or with "Vasu", wealth; and to mean a cloud when it is used in connection with streams or seven streams. As the words "Gāvah, Vasu, and Āpah" are each used in the sense of "rays of light" in the Vedas, their disappearance in drought or when stolen by Śambara or Vritra implies an eclipse, as already pointed out in the verses quoted above. If so, what then does the number "Sapta", seven, in the phrases "Saptagiri, Sapta devagavyah, Saptavidhah Purushah, Saptendriyāṇi Saptāśvāh" signify? It is a puzzling number frequently used as a numerical epithet to several things in the Vedas. Rig. X. 85, 4 seems to contain a clue to explain this puzzle. There we are told that Soma, the moon, is kept under cover by the seven Bārhatas or Gandharvas called Svāna, Bhrāja, Anghāri, Bambhāri, Hasta, Suhasta, and Viśvāvasu. The verse is as follows:—

आच्छद्विधानैर्गुपितः वार्हतैस्सोम रक्षितः ।

"O Soma, thou art Guṇita, kept under cover, and thou art safely secured by the Bārhatas (the seven Svāna and other Gandharvas according to the commentator) whose contrivance consists in enveloping or covering (whatever they like to be kept under cover). The word "Āchhad" in the above verse meaning "cover" implies a shadow under which an eclipsed moon is kept for some time. The Gandharvas together with Yakshas, Rakshasas, and Kinnaras are elsewhere said to be under the command of Vaiśravaṇa or Kubera, to whom offerings are made for withdrawing his eclipse-causing hosts. It follows, therefore, that the several things which are counted as seven in number are in some way or other connected with eclipses and eclipse-cycles. Like-wise

the word "Varuna" is interpreted by Sāyaṇa and other commentators to mean "Āvaraka, Achhādanakartā" in the Tait. Aranyaka passage "Paṭaro, Viklidhah, Pingah,etadvaruṇalakṣhaṇam." That passage is, as will be shown, a definition of an eclipse-cycle of 1000 days with three eclipses. Before proceeding to take up that passage for explanation, I take up the Aranyaka passage describing Indra's or Savitar's war with Sambara in order to show how eclipses are generally described in the Vedas.



INDRA'S WARS WITH SAMBARA

The Vedas frequently speak of Indra's war with Sambara and of the destruction of the latter's forts, the number of which is variously mentioned. In Rg. 1, 130, 7, the number is said to be ninety. In Rg. 2, 19, 6, and 4, 26, 3, it is said to be ninety-nine; and in 2, 14, 6, and 4, 30, 20, the number is one hundred. The forts are also spoken of as being of three colours, as black as iron on the earth, silvery white or gray in the atmosphere, and as yellow as gold in the sky. Various conjectures are made about the real nature of these wars. Some scholars took them to be the wars made by the advancing Aryans with the aboriginal tribes. But the description of the forts as being situated in the three regions of earth, air, and sky does not fit in with the above explanation. The *Taittirīyāranyaka* however, seems to contain a clue to unlock the mystery of the riddle. The passage runs as follows:—

सवितारं वितन्वन्तं अनुबध्नाति शम्बरः ।
 आपपूर्शम्बरश्चैव सवितारेपसो भूत् ।
 त्वं सुतृप्तं विदित्वैव बहुसोमगिरं वशी ।
 अन्वेति तुग्रो वक्रियां तं आयसूयन्त्सोमतृप्सुषु ।
 स सङ्गामस्तमोद्योऽत्योतः वाचो गाः पिपाति तत् ।
 स तद्गोमिस्तवात्येत्यन्ये रक्षसा अनन्विताश्च ये ।

Tait. Ar. I, 10.

अमी ऋक्षा निहितास उच्चा नक्तं ददृशे कुहचिद्विवेयुः ।
 अदब्धानि वरुणस्य व्रतानि विचाकशच्चन्द्रमा नक्षत्रमेति ।
 अपागूहृत सविता तृभीन्सर्वान् दिवो अन्धसः ।

नक्तं तान्यभवन् दृशे अस्थ्यस्थना सम्भविष्यामः ।

नाम नामैव नाम मे नपुंसकं पुमान् रुयस्मि ।

स्थावरोऽस्म्यथ जङ्गमः यजेऽयक्षि यष्टाहे च ।

Tait. Ar. I, 11, 1-3.

Śambara follows the progressing sun; Śambara as well as Apapūh.

The sun became dim. Knowing him to be intoxicated after his drinking plenty of Soma¹ (the moon), the fierce and sober demon follows the sun's plight, thinking of an easy victory in the Soma-feasts. A battle ensues to cut through the pitch dark with horses. Speeches like the cows suckle the sun; and being extolled by the praises he revives and excels other gods, who were not face to face with the demon, or were not followed by the demon.

The (seven) Bears, placed high up in the sky, are seen at night and go somewhere during the day. These rules of Varuṇa are inviolate. The shining moon follows the Nakṣatra. (But now) the sun concealed all his rays from the dark sky: that is night; they (the Bears) come in sight. We become now merely bony with bones; every thing is merely a name and name alone with no lustre or brilliance, no eunuch, or man or woman am I, (there being no light to distinguish), I am immovable and then movable. I worship; I worshipped before; and I shall worship later on, in future."

We are told in the above passage that Śambara pursued the sun who was fully drunk with Soma-draughts

¹ Because it was a new-moon day when Gods are believed to drink of Soma completely.

and the weapon which sober Śambara used was darkness. In the battle that ensued the sun mounted on his chariot drawn by horses succeeded in cutting off the pitch dark. The volume of praise made by the people fell upon him like milk from the cows or water from clouds and infused enthusiasm in him so as to make him shine better than other gods who were not chased by the demon. During the darkness the Seven Bears and the stars which are not visible during the day became visible, a strange fact going against the law of Varuṇa. These wars are, as stated in other parts of the Vedas, periodical.

Can there be any doubt that the above passage is a vivid description of a complete solar eclipse? Nor has the Araṇyaka left us in the dark as to the date when this eclipse occurred or recurred. In the beginning of the work there is a distinct reference to the cycle of sixty years beginning with Prabhava and ending with Akṣaya. In 1, 3 we are told that the cycle of sixty made thirty revolutions and that the northern and southern Ayanas were also sixty each. (Śaṣṭischa triṃśakā valgā śuklakṛṣṇau cha śāṣṭikau). Evidently the number of years counted as having passed from the commencement of the Kali era was 1800. Accordingly it seems to be B.C. 1300 or 1299 when the eclipse occurred. According to SWAMIKANNU PILLAI'S Tables IV-L of the cycle of recurrence of eclipses there was a nearly complete solar eclipse on 27th Sept. A.D. 414. Now 1711 years—2 days is a good cycle of recurrence of eclipses according to the same author. Accordingly 1711-413 is equal to 1298, which is counted as 1299 B.C.

The Vedic people had a cycle of sixty years, as already pointed out. This cycle is made up of three cycles of 20 years each. This cycle of 20 years seems to have been devised by the Vedic people as a cycle of the season of eclipses which is different from the cycle of recurrence of eclipses, namely 19 years, or 18 years and 11 days. To find out the season of eclipses in B.C. 1299 or 1298, the following Table is devised by Mr. CHICKANNA SIDDHANTI of Mysore. The same Table can be used to find out the season of eclipses in any B.C. or A.D. year.

No. of single years. Re- maining days.		No. of 20 years' cycle. Rem. days.	
1	18.6310	1	26.0010
2	37.2620	2	52.0020
3	55.8930	3	78.0030
4	74.5240	4	104.0040
5	93.1650	5	130.0050
6	111.7660	6	156.0060
7	130.4170	7	182.0070
8	149.0480	8	208.0080
9	167.6790	9	234.0090

The Kṣepaka quantity for both single years and cycle of 20 years is 10.2445 for A.D. 0 year or B.C. 1.

Note 1. Add the remaining days of any B.C. year to the Kṣepaka and deduct the same from the Kṣepaka in A.D. years.

Note 2. One revolution of combined movement of sun and node (Ravi-Rāhu-antara) is 346.6190 days.

Table 2 showing the daily and yearly motion of Tithi by the same Siddhānti:—

No. of days.	Velocity.	No. of years.	Velocity.
1	1.01589577	1	11.05593
2	2.03179154	2	22.11186
3	3.04768731	3	33.16779
4	4.06358308	4	44.22372
5	5.07947885	5	55.27965
6	6.09537462	6	66.33558
7	7.11127039	7	77.39151
8	8.127166193	8	88.44744
9	9.14366193	9	99.50337

Note 3. Kṣepaka of Tithis for A.D. 0 year or B.C. 1 is 5.7013.

Note 4. In Leap-years deduct one day's velocity from the total and in odd years deduct $\frac{1}{4}$ th, $\frac{1}{2}$, and $\frac{3}{4}$ th of a day's velocity in 1, 2, and 3 years respectively.

Note 5. Deduct the total velocity from the Kṣepaka in B.C. years and add the same to the Kṣepaka in A.D. years. The same rules apply to the next Table also.

Table 3 showing the daily and yearly motion of Ravi-Rahu-antara causing eclipse:—

No. of days.	motion.	No. of years.	motion
1	1.0386026	1	19.34951
2	2.0772052	2	38.69902
3	3.1158078	3	58.04858
4	4.1544104	4	77.39804
5	5.1930130	5	96.74755
6	6.2316156	6	116.09706
7	7.2702192	7	135.44657
8	8.3088208	8	154.79608
9	9.3474238	9	174.14559

Note 6. The Kṣepaka for B.C. 1 or A.D. 0 is 349.3598562.

Note 7. Rules 4 and 5 apply also here.

Now B.C. 1299 is the year of the eclipse under consideration. As a rule we have to deduct one year from all B.C. years. Accordingly 1299-1 is 1298. Dividing 1298 by 20 we have 64 cycles of 20 years and 18 odd years remaining. Now by Table 1 the remaining days in 60 cycles of 20 years are (by shifting the Decimal point by one place to the right.)

60 cycles of 20 yers	....	1560.06
4 cycles of 20 years	....	104.01
for 10 year	....	180.63
for 8 years .	....	149.04
		<hr/>
Total	....	1993.74

Dividing this by 346.61 we have 5 revolutions of 1733.05 days and 260.69 days remaining from Jan. 1 of 1298 B.C. Adding the Kṣepaka of 10.24 we have 270.93 days.

Now according to SWAMIKANNU'S Table IV-L the eclipse in 414 A.D. happened on 196th day from the beginning of the Hindu solar year or 270th day from January. This shows how exact is the cycle of 20 years of the season of eclipses.

Now to find the Tithi on the 270th day of 1298 B.C. by Table 2.—

Tithi for 1000 years	11055.93
„ 200 years	2211.18
„ 90 years	995.03
8 years	88.44
	<hr/>
Total	14350.58
Deduct for odd days	—50
	<hr/>
	14350.08

Dividing this by 30 and casting out 478 revolutions of 30 Tithis we have 10.08 Tithis remaining, that is the 10th Tithi passed on. Now deduct the same from Kṣepaka 5.7030 or 35.7030, adding one revolution.— 35.7030—10.08 is equal to 25.6230 on Jan. 1 of B.C. 1298.

Now Tithi for the remaining 270 days we have by the same Table 2.

Tithi for 200 days	203.1791
„ „ 70 days	71.1127
„ on Jan 1	25.6230
Total	<hr/> 299.9148
Deducting nine rounds of 30	270.
We have	<hr/> 29 9148

that is, the new moon Tithi is current and it is suitable for the solar eclipse. Now Ravi-Rāhu-antara by table 3:—

for 1000 years	19349.51
„ 200 years	3369.90
„ 90 years	1741.45
„ 8 years	154.79
Total	<hr/> 15115 65

Dividing by 360 cast out 68 revls.

The remainder is	275.15.
The Kṣepaka is	349.3598562
Deducting the above from this	275.150
We have	<hr/> 74.2098562

Now for 200 days	207.7205200
70 days	72.702182

Total 354.6305582

when a nearly complete solar eclipse is certain.

Now, concluding I may state that Śambara was an eclipse demon of the type of Rāhu and that Indra's battle with him is a slow clearance of the eclipse. The three forts referred to are elsewhere described as (1) Ayomaya, as black as iron, Rajomaya, as grey as silver, and Harinmaya, as yellow as gold.



THE VEDIC ECLIPSE CYCLE OF 1000 DAYS.

There can be no doubt that Śambara means an eclipse demon of the type of Rāhu and a war between the Devas and Asuras means no more than an eclipse, solar or lunar. In describing a conflict of the Devas with Śambara and other Asuras, the Vedas frequently refer to three kinds of forts, namely, those that are as black as iron, as gray as silver, and as reddish yellow as gold. There can be no doubt that in saying so the Vedic poets meant eclipses of three distinct colours, black, gray, and reddish yellow. In Tait. Samhita, 2, 1, 2, the same is spoken of as Krishṇa, black, Lohita, red, and Valaksha, grey. In A. V. 13, 3, 9 a Krishṇa eclipse is said to go by the name "Mitra" in day time and "Varuṇa" in the night. The same appearing in the midst of the sky and the earth is stated to bear the name, "Indra". The same is called "Paṭara", when it is high up in the sky, and "Rohita", when it is reddish. Thus while both solar and lunar eclipses are said to be of three different colours in the Vedas, Varāhamihira restricts the colour distinction only to lunar eclipses, thus—

सर्वग्रासे पीतं वर्णविशेषं वदेन्निशानाथे ।

उदयास्तग्रासधूम्रं खण्डग्रहणे च सलिलाभम् ।

Panchasidhāntikā 6, 9.

"During a total eclipse dark yellow is to be declared the peculiar colour of the moon; her colour is dusky in the case of eclipses taking place during the rising or setting of the moon; and waterish in the case of partial eclipses."

Likewise the Sūryasidhanta 6, 23 says—

अर्धादूने स धूम्रं स्यात्कृष्णमर्धाधिकं भवेत् ।

विमुञ्चतः कृष्णताम्रं कपिलं सकलग्रहे ।

If it is less than half, it is of smoke-colour; if it is more than half, it is black; and reddish black, if it leaves some portion uncovered; If it is a total lunar eclipse, it is brown."

Blending the lunar eclipses with time, the Tait. Aranyaka speaks of their cyclic nature as follows:—

पटरो विक्लिधः पिङ्गः एतद्वरुणलक्षणम् ।

यत्रैतदुपदृश्यते सहस्रं तत्र नीयते ।

Paṭara, that which is clothed, as it were, with white or gray cloth; Viklidhah, that which is charred (so as to be black); Pingah, that which is brown, these are the characteristics of Varuṇa (moon); whenever these are seen, then one thousand days are assigned to them.

This is the most important passage in the whole of the Vedic literature. It means that in every thousand days counted from the day of an initial lunar eclipse there occur three lunar eclipses, of which one is nearly a total eclipse, a second of six digits (Ardhagrāsa), and a third of less than six digits. Now let us see how this Aranyaka Eclipse-cycle of 1000 days fares in the big 58 years' cycle of eclipses prepared by the late L.D. SWAMIKANNU PILLAE on the authority of German, French, and English charts of ancient and modern eclipses and published in his "Indian Ephemeris". For easy reference only the first column of his Table IV-L of eclipses is herein copied. This Table gives all the possible solar and lunar eclipses that have occurred in

various parts of the globe in each of the 58 years from A.D. 1 to A.D. 58. It is a cycle of 58 years minus 41 days. It enables us to ascertain roughly the days and size of both solar and lunar eclipses that had occurred in any B.C. or A.D. year. If for example we want to know all the possible solar and lunar eclipses that occurred in A.D. 100, all that we have to do is to take that year of the cycle which gives 100 when added to 58. In the present case it is 42. It means that all the solar and lunar eclipses given against the year 42 had also occurred in A.D. 100 on the same days minus 41 days. In the case of B.C. years, we have to deduct 1 from the given number of B.C. years and then find out that number which gives the B.C. year when added to 58 or its multiples minus 41 days or its multiple. Taking B.C. 100, we deduct 1 from it and take B.C. 99. As $41 + 58$ is 99, we take A.D. 41 as the year of the cycle. It means that all the solar and lunar eclipses given against A.D. 41 had also occurred in B.C. 99 on the same days minus 41 days. In the Key to Table IV-L (P. 336 of Ephemeris) Swamikannu Pillai has given all those years up to 2000, which correspond to each year of the 58 years' cycle. The same numbers of years hold good in the case of B.C. years also, provided we deduct 1 from the given B.C. years. It follows therefore that the cycle of 58 years is a comprehensive specimen cycle to test the Āraṇyaka cycle of three lunar eclipses of different digits and colours in One thousand days. The same cycle of 1000 days holds good in the case of solar eclipses also. In every period of 1000 days there occur three solar eclipses in each of the two nodes like lunar eclipses. But they may not all be visible in the same locality as lunar eclipses generally are. In the case of

lunar eclipses also the Paṭara eclipse of less than 6 digits may not sometimes be visible in the locality in which the other two appear. As solar eclipses differ from lunar eclipses in respect of visibility, the Araṇyaka seems to have confined its cycle only to lunar eclipses by mentioning Varuṇa instead of Mitrāvaruṇa. Leaving out the question of visibility, it is a very good cycle of three solar and lunar eclipses in each node in 1000 days. The Araṇyaka would not have been wrong, if it had included also Mitra, the sun, in its definition of the cycle and said "etadmitrāvaruṇalakṣhaṇam," instead of "etadvaruṇalakṣhaṇam." Let us now try the soundness of the Vedic eclipse-cycle of 1000 days in the annexed Table of the big cycle of 58 years minus 41 days.

The first or initial solar eclipse noted in the Table is on the 265th day of the Hindu solar year. Counting three eclipses from it, we see that there was a solar eclipse on 254th day of A.D. 2 after an interval 354 days, a second eclipse on the same node on 243rd day after an interval of 354 days, and a third on 202nd day after an interval of 325 days. Thus there were three solar eclipses in $354 + 354 + 325 = 1033$ days.

Since the distances of the sun from the node were 352° , 343° and 5° , the third was larger than the second, and the first on the 354th day was larger than the second and less than the third.

Likewise in the case of the next group of three solar eclipses the interval from 202 to 191 days is 354 days
 and " 191 to 180 " 354 ,
 and " 180 to 170. " in A.D. 7 is 354 "

Total 1062 days.

Similarly in the case of eclipses on the descending node :

Interval from 87 of A.D. 1 to 76 of A.D. 2 is	354 days.
„ 76 A.D. 2 to 65 „ 3 is	354 „
„ 65 A.D. 3 to 25 „ 4 is	325 „
<hr/>	
Total	1033 days.

Likewise in the case of lunar eclipses :—

Interval from 250th day of A.D. 1 to 239 of A.D. 2 is—	354 days.
„ 239 „ 2 to 228 of A.D. 3 is	354 „
„ 228 „ 3 to 217 of A.D. 4 is	354 „
<hr/>	
Total	1062 days.

In the case of the descending node :—

Interval from 102 of A.D. 1 to 62 of A.D. 2 is	325 days.
„ 62 „ 2 to 51 „ 3 is	354 „
„ 51 „ 3 to 40 „ 4 is	354 „
<hr/>	
Total	1033 days.

Thus the total number of days for a group of three solar or lunar eclipses visible or invisible in the same locality is 1033 or 1062. Such counting is only possible for a mathematician acquainted with the canon of eclipses. But as the ancients framed their canon of eclipses merely from observation, let us take the case of four successive visible solar and lunar eclipses in the same cycle and see whether the rule holds good there also. The four lunar eclipses on the descending node in the years from A.D. 18 to A.D. 21 are marked with an asterisk as visible in India ; likewise the four solar eclipses on the ascending node in the four years from A.D. 30 to A.D. 33 are marked with an asterisk as visible. Here also the total

number of days for the group of three eclipses is 1062 and 1033 respectively. It is to be noted that while most of the lunar eclipses are marked as visible, most of the solar eclipses are not marked as visible in India. Hence it may be concluded that the ancients framed their cycle of 1000 days from observation of solar and lunar eclipse carried on for a number of years.

The text of the Aranyaka describing the eclipse cycle of 1000 days together with an English translation of the text is as follows :—

पटरो विक्लिधः पिङ्गः एतद्वरुणलक्षणम् । यत्रैतदुपदृश्यते
सहस्रं तत्र नीयते । एकं हि शिरः । नाना मुखे । कृत्स्नं तद्वतुलक्ष-
णम् । उभयतस्सप्तेन्द्रियाणि । जल्पितं त्वेव दिह्यते । शुक्लकृष्णे संव-
त्सरस्य दक्षिणवामयोः पार्श्वयोः । तस्यैषा भवति—

शुक्रं ते अन्यद्यजतं ते अन्यत् । विषुरूपे अहनीद्यौरिवासि । विश्वा
हि माया अवसि स्वधावः । भद्रा ते पूषन्निह रातिरस्तिविति । नात्र
भुवनं न पूषा न पशवः नादित्यः । संवत्सर एव प्रत्यक्षेण प्रियतमं
विद्यात् । एतद्वै संवत्सरस्य प्रियतमं रूपम् । योऽस्य महानर्थ उत्प-
श्यमानो भवति इदं पुण्यं कुरुष्वेति तमाहरणं दद्यात् ॥

साकं जानां सप्तथमाहुरेकजं षड्व्यमा ऋषयो देवजा इति । तेषा-
मिष्टानि विहितानि धामशःस्थात्रे रेजन्ते विकृतानि रूपशः ॥

को नु मर्या अभिथितः सखा सखायमब्रवीत् । जहाको अस्म-
दीषते । यस्तित्याज सखिविदं सखायं न तस्य वाच्यपि भागो अस्ति ।
यदीं शृणोत्यलकं शृणोति न हि प्रवेद सुकृतस्य पन्थामिति । ऋतुः
ऋतुना नुद्यमानः विननादाभिधावः । षष्टिश्च त्रिंशकावल्गाः शुक्लकृष्णौ
च षाष्टिकौ ॥

“Paṭara, covered as it were with a piece of cloth, Viklidha, burnt or charred, and Pinga, brown—these are the characteristics of Varuṇa (one who covers); when

this is seen, then one should consider that one thousand days are passed. Single is the head (the initial eclipse); varied is the face; the whole of that is the characteristic of Ritu, procreating season. On both the sides there are, as it were, seven senses or vital powers; this is merely a description in personal terms; actually there is nothing corresponding to a body. White and dark are the year's right and left sides; this is said about it:—Thy white side is one; and thy worshippable side (the dark side) is another; thy days are different; thou art like the sky (white in the day and dark in the night); thou hast food and thou createst all kinds of illusions; O Pushan, may thy gift be good; there is no world; nor Pushan; nor quadrupeds, nor the Āditya; only the year is perceived; one understands it, because it is dear to one; the year is cherished, because it comes promising large gifts and commanding one to observe this or that meritorious act. One should return the gift thus received.

Of those that are born together sages have called the seventh single-born, for six are the twins and moveable and born of the gods; sacrifices appropriate to their different stations are prescribed; being various in form and colour they revolve for the sake of the stationary.

Is there any one, O men, who with no harmful tendency speaks of his friend thus:—this man runs away; he does not deserve of being mentioned even by name; if such a thing is heard of, it must be really false; for a deserting friend is not aware of the path of virtue. For one Ritu (eclipse causing the birth of creatures) driven by another preceding it exclaim about this. Sixty (years are) thirty fold; the white and dark parts also are sixty."

According to the commentators the head here means the year ; the faces are the two Ayanas; the whole (Kritsna) means the head containing the two sides ; it constitutes the Ritu when creatures are born ; on both sides, namely the two Ayanas there are born bodies containing seven sensory organs (or productive and destructive powers of Indra); the white side is the Uttarāyana and the dark side is the Dakshināyana when sacrifices are usually performed—; regarding the meaning of the passage " If one hears of this & &—" commentators differ: The Tāntric scholars take it to refer to the graph of the 'Ī' sound of the Devanāgarī alphabet; the graph is written like three dots placed at the angular corners of a triangle ; it is meant to represent the three eyes of the Goddess " Tripura Sundari ", or her face and her two breast nipples; if, out of these three Puras, one is missed, the other two can not be read as 'I'.* Other commentators take the word " Īm " in the sense of " this ", and interpret it to mean a deserting friend ; all commentators are however silent as to who the deserting friend is here. The commentators take the passage " Sixty are thirtyfold " to refer to a season of two months of thirty days each and explain the words " Suklakraishnau " as meaning the days and nights of a season of two months. But according to the Vedāṅgajyautisha a season consists nearly of 61 days and not sixty days. The words " sukla and krishna " are used in the sense of the two Ayanas, the Uttarāyana and the Dakshināyana in the beginning of the passage itself. They are used in the same sense in the Bhagavadgītā also. Accordingly 'Su klakraishnau' must necessarily

* See Lakshmidhara's commentary on 'Sivah Saktih Kāmah &c.' of the Saundaryalahari.

mean sixty twofold Ayanas here also, that is, sixty years. Hence the sentence "sixty are thirtyfold" must necessarily mean thirty times sixty years, or 1800 years. The sixty years' cycle is clearly referred to in the beginning of the Aranyaka itself in the phrase "from Prabhava to Akshaya". Āryabhaṭa who lived in A.D. 500 says in his astronomical work called Āryabhaṭīya that he was 23 years old when the sixty year' cycle revolved sixty times making the Kaliyuga 3600 years old. It follows therefore that the author of the Aranyaka lived 1800 years before Āryabhaṭa. The track in which the total solar eclipse described in the Aranyaka occurred began in about B.C. 2100 and closed in about B.C. 900. In the course of about 1200 years of this track there were about 63 cycles of 19 years each or 18 years 11 days. The eclipses of these cycles were of course of different digits, only a few near the node being total or nearly total. On the strength of the reference made in the Aranyaka to the cycle of 60 years and its thirty times revolution, the eclipse in question was assigned to B.C. 1298. If scholars do not agree with me in thinking that there is in the Aranyaka such a reference, even then we can not help assigning the eclipse to the same date in virtue of its track passing through the zodiacal sign Leo. For neither an earlier nor a later track for this eclipse can be selected. • An earlier track takes the Aranyaka and the Vedas to an earlier date than that which can be assigned to them in consideration of other chronological data. The same is the case with the selection of a later track. The description made in the Aranyaka that the Seven Bears were visible during the eclipse shows that the month when this eclipse occurred was Leo or Srāvaṇa. The union of the

sun and the moon on the newmoon day is regarded in the Vedas as the cause of creation (Ritu) of every form of life in the world. The moon is described as being born anew after making a Ritu on the newmoon day (A.V. 13, 2). It follows therefore that the day of a solar eclipse is also a day of Ritu, creation.

Apart from giving the meaning of the words in the above passage no commentator has taken the trouble of enlightening us as to what the Vedic poets meant by saying that gray, black, and brown are the colours of Varuṇa, and that 1000 days are spent when Varuṇa is seen in these three different colours; nor have they explained what the poets meant by seven vital powers or by six twins and the seventh single-born, and what they meant to convey by speaking of a friend deserting a friend. Whether they knew the meaning and intentionally concealed it or they did not know it owing to loss of tradition, it is difficult to say.

I am inclined to take the whole passage as referring to two kinds of eclipse-cycles, one of 1000 days and a second of 7000 days. As already shown, Paṭara, Vikliḍha, and Pinga are three lunar eclipses occurring in the course of 1000 days. What is called the "single head" means an initial eclipse from which 1000 days are counted. The two varied faces are the two Ayanas, the so-called wings of the yearly bird "Suparṇa" containing the two nodes. A. V. X, 8, 8, says that the Hamsa's wings are expanded by 1000 days, when flying to heaven. The seven Indriyas seem to mean seven vital powers, seven Retas-seeds or Ritus, procreating powers, the moon being Reto-dha, seed-laying god. The moon is described in the Rigveda as ever being reborn after

making a Ritu on the newmoon day. According to Chambers' Hand-book of Astronomy quoted elsewhere the ancients counted one intercalary month in 1000 days. Accordingly it may be said without fear of contradiction that the seven Indriyas or Ritus or seasons of Retas are seven intercalary months, the presiding dieties of which are the seven Adityas, or seven Aditi's sons. They are named as (1) Dhā̄ā, (2) Aryama, (3) Mitra, (4) Varuna, (5) Amsa, (6) Bhaga, (7) Indra. Aditi is said to have brought forth three twins or six twin sons and a seventh son single, the other son of the fourth twins, being half-born (Mārtāṇḍa) and therefore cast out. According to A. V. V, 6, 4 the thirteenth month is the house of Indra. In the list of the Adityas just given Indra is the lord of the seventh month and is an eclipse-clearing god. It follows therefore that the other Adityas are also eclipse-clearing gods. The cycle of seven thousand days yielding seven intercalary months are also called seven Lokas, worlds, known as (1) Bhu, (2) Bhuvah (3) Suvah, (4) Mahah, (5) Janah, (6) Tāpah, and (7) Satya, to each of which are assigned 1000 days in the Aranyaka—"Sahasravridiyam bhumih param vyoma sahasravrit"; the Bhuloka is measured by 1000 days and the distant Vyoma-world is also measured by 1000 days. The implication is that the intervening five worlds also contain or are measured by 1000 days each. It is an astronomical canon that 7000 days yield seven intercalary months and are nearly equal to 19 solar years or 19 lunar years and seven lunar months or 235 lunations forming an eclipse cycle. There are two eclipse cycles, one measured by 223 lunations or 18 solar years and 11 days and another by 235 lunations or 19 solar years. In his Elements of Astronomy (P. 236-7) R. S. Ball says

regarding the Eclipse-cycle as follows :—" The interval between two successive newmoons is termed a lunation, and it is by this period that the successive phases of the moon are regulated. The length of the lunation is such that 223 lunations make 6585 32 days. Thus 19 periods of the revolution of the sun with respect to the nodes of the moon coincide very nearly with 223 lunations. This remarkable period, amounting to about 18 years 11 days, is of service in the prediction of eclipses. It is known as the Saros. Another very remarkable period arises from the circumstance that 235 lunations form 6939.69 days, while 19 years of 365.25 days amount to 6939.75 days. We therefore conclude that 19 years are nearly identical with 235 lunations. This is the cycle of Meton. If the dates of new moon and full moon are known for a period of 19 years, they can be predicted indefinitely, for in each subsequent 19 years the dates are reproduced in the same manner."

Regarding the prediction of eclipses, solar and lunar, the same author says (P. 240 and 243) as follows :—

" An eclipse of the moon takes place when the moon, at the time of full moon, is near the node of its orbit on the ecliptic. Let us, for example, suppose that the time of full moon happened to be exactly coincident with the passage of the moon through its node. The position of the node must then be 180° distant from that of the sun. In the period of 18 years 11 days we find that 19 complete revolutions of the sun will have taken place with respect to the moon's nodes. It therefore follows that in 18 years 11 days after the date of the eclipse the node of the moon will again be 180° distant from the sun. But in very nearly the same period 223 lunations will have been completed. It therefore follows that in 18 years 11 days after

the moon has been full at the node, the moon will again be full at the node. An eclipse may occur, even though the time of full moon does not exactly coincide with the time of passing through the node, provided that the moon is sufficiently near the node at the time of full. The same circumstances will recur again at an interval of 18 years 11 days, and therefore we shall find in general that 18 years 11 days after the occurrence of a lunar eclipse there will be another lunar eclipse. If, therefore, we know all the eclipses which have occurred in a period of 18 years 11 days, we are then able to predict future eclipses with considerable accuracy. For example, in the year 1862 a total eclipse of the moon, visible at Greenwich, occurred on June 11. Eighteen years 11 days from that time bring us to June 22, 1880, and accordingly on that date again there is a total eclipse of the moon. So also the eclipse of the moon on December 5, 1862, is followed at the same interval of 18 years 11 days, by an eclipse which occurs on December 16, 1880."

It should, however, be observed that the numerical relation between the synodic revolution and the period of the lunation is only approximate. We cannot therefore employ this method of prediction with infallible accuracy. It may sometimes happen that a small partial eclipse is not followed by an eclipse in 18 years 11 days; and also that a partial eclipse may occasionally occur, though no eclipse took place 18 years 11 days previously. For accurate prediction of the occurrence of eclipses at remote epochs, as well as for an accurate account of the details of eclipses as to the time of commencement, and the duration, with such other particulars as are given in the Nautical Almanac each year, careful calculations

have to be made. Such calculations depend upon our knowledge of the motions of moon, derived from long-continued observations.

"Although it generally happens that a solar eclipse is followed by a solar eclipse in the period of 18 years and 11 days, yet we cannot predict the recurrence of solar eclipses in so simple a manner as we can the recurrence of lunar eclipses. It is not possible by the mere use of this period to say whether the solar eclipse will be visible at a given place, or what the magnitude of the eclipse may be. The sun's eclipses and all their circumstances can, no doubt, be, predicted with great accuracy; but then, such predictions are the result of considerable calculations of a more intricate character than are required for predicting the details of the eclipses of the moon."

As seven are the periods of 1000 days, seven the intercalary months presided over by seven Adityas, and seven the triple solar eclipses in each wing or node, the total number being 42 except the lunar eclipses which are only thirty on the whole, in each eclipse-cycle of 19 years, the seven and other numbers came to be regarded as mystic and are given places in amulets such as the Sri-chakra which is a graphical representation of the eclipse-cycle. In the Purushasūkta the seven periods are called seven Paridhis, enclosures and the three eclipses in each Paridhi or enclosure are called (three-times seven) kindling sticks. In Rigveda, 9-12, the Vasishthas are said to be traversing the hidden thousand-branched world, the Paridhis of which (of course seven Paridhis) the Apsarasas are said to be weaving. The same seven enclosures are called the seven hills of Śambara, each

hill containing three Puras or forts. In Rig. 10, 190, 1-3 we are told that Rita and Satya (the two Ayanas) came from Tapas and from it there came the Samudras (seven in number) and from the Samudras there came the *Adhisamvatsara*, *intercalary year* made up of twelve intercalary months; and that at the close of the *Adhisamvatsara*, Dhatar, the god of the first intercalary month, put the sun and the moon (in the same place) as before. We know that in the course of 12000 days or 33 lunar years there will be 12 intercalary months, at the close of which the sun and the moon will be in the same place and begin their races again and that the moon will gain one year over the sun and come in conjunction with the latter at the close of 33 lunar years. The same is the case at the close of the cycle of 19 years. Accordingly it follows that at the close of 19 years, Dhatar, the first of the seven Adityas, begins the creation of the earth, air, and the sky of the year-world and that at the close of the 33 years, the same Dhatar, being the first of the twelve Adityas, begins the creation of the time-world again. This goes on endlessly and each cycle is called a Kalpa, epoch.

In the verse on the birth of the seven Adityas or sages, as they are called, there is also the hint of an eclipse-cycle. By saying that six are born as twins and that the seventh is single-born, the verse seems to imply that six triplets of eclipses appear as twins, that is, three solar or lunar eclipses appear on each of the two wings or nodes and as the cycle closes by about 6585 days, only one triplet appears on the first wing or node and no triplet appears in the other wing or node of the last 500 days of the 7th cycle of 1000 days. Instead of a triplet as a friend of the first triplet appearing on the first half

of the last cycle, there will appear the initial eclipse from which the counting of 1000 days was begun. Even in the 12 years' cycle there re-appears the initial eclipse after 6939.75 days instead of the complete triplet in the second half of the seventh period of 1000 days. This seems to be the meaning of the verses speaking of a friend deserting another friend forfeiting not merely a share of the sacrificial offerings, but also the right to the mention of his name. The friends referred to appear to be the Mitravaruṇa or solar and lunar eclipses appearing as friends in each of the six cycles of 1000 days each. But in the latter half of the 7th cycle the initial eclipse (Sirah) re-appears instead of the second of the twins. The twins here may be either only the solar eclipses or lunar eclipses on the two wings. If such is the case, then similar eclipses can very well be termed as friends. It is this appearance of similar eclipses, cycle after cycle of 18 or 19 years each, that is spoken of in the Vedic verse (Dhātā yathāpūrvamakalpāyat) as the work of Dhatar making things as before. It is this cycle of 7000 days that gave rise to the 2000 Yugas of Brahma-kalpa of the worlds' creation and destruction referred to not only in the Amarakosa, but also in the Purāṇas and astronomical works. A yuga originally meant a Parva of 14 days, as I have shown in my "Drapsa: the Vedic cycle of Eclipses." Now 7000 days are half of 14000 days constituting a thousand Parvas of 14 days each. These 1000 Yugas or Parvas are divided into 500 day-periods and 500 night-periods. If we take two thousand Yugas or Parvas instead of 1000, the day-period will come to one thousand Parvas and the night-period also will be of equal duration. This is clearly stated not only in the Amara, but also in the Bhagavadgita. The Amara says

that 2000 divine Yugas constitute one Ahoratra or Day-and-night Kalpa of Brahma ; and that they are two Kalpas, a day-kalpa and a night-kalpa, to men. The Bhagavad-gītā gives expression to the same idea and adds that at the beginning of the day-kalpa all things re-appear and during the night-kalpa they disappear.

Thus the simple kalpa of eclipse-cycle of nearly $14\frac{1}{2}$ (1000 days) or 500 Yugas or Parvas, newmoons and full moons causing the recurrence of eclipses which are regarded as Ritu or creative periods in the Vedas, has undergone a thorough change at the hand of later Puranics and astronomers and came to mean a huge period of 2000 Mahāyugas when the world is created and destroyed. The Parvas are of four kinds, Krita, Tretā, Dvāpara, and Kali, all originally meaning Parvas of 14 days each. They also came to mean huge periods in the later works. Fortunately for us the original numbers are kept unaltered and we can even at this distance of time clearly see how the change has come to pass. In order to include all these four Parvas in the Period, half a thousand has been quadrupled and the day and night kalpas are made to be equal to 1000 Yugas or lunations each.

The same cyclic period is personified in the Vedas as Kalpapurusha, Time-man. A Puruṣa is said to measure 1000 (Puruṣo vai śahasrah). Seven Puruṣas (Saptavidhah Purushah) measure 7000 days, forming a cycle of 19 years.

As the Uttarāyana and the Dakshināyana periods are called the day and night periods of the year, the day period of the intercalary year was the seven intercalary months constituting the 19 years and the night period was the remaining 5000 days of the intercalary year of 12 intercalary months. But the later writers made the night

period also to be of equal duration, that is, 500 Parva-yugas or doubling it, 1000 Yugas.

Thus by saying that Paṭara, Viklidha, and Pinga eclipses are the characteristics of Varuṇa and that these three eclipses recur in each period of 1000 days, the Taittiriya-āraṇyaka has expressly and clearly stated the eclipse-cycle of 1000 days. By saying that the head of the Time-man contained seven Senses, meaning creative organs, called Ritus, the Aranyaka extended the minor cycle of 1000 days to only 7000 days. The Aranyaka 10, 15 says that the Vedic Samhitā is to be interpreted into five heads: as a description of world (1. Adhiloka), astronomical process (2. Adhijyautisha), educational (3. Adhividya), creation (4. Adhipraja), and spiritual (5. Adhyātma); accordingly we find the same phenomena of eclipses described in the Vedas as a cattle-raid following the manner of the world, or as astronomical in the statement of Svarbhānu striking the sun, or as educational in the statement that the eclipsed moon goes as a Brahmachari covered with a deer's skin to learn under the sun; his learned teacher, or as creation of the world, or as Māya covering Brahma. Hence the seven periods of the eclipse-cycle of 1000 days are called here seven senses, since it is the senses that are the chief instruments of operation in all these five processes of the world. If there is any doubt in this, the seven Paridhis of 1000, clearly stated in Rig. IX. 12, are enough to remove the doubt. Even if this is doubted, the expression of seven Puruṣas of 1000 each and 'Sahasrātma' seems to be unambiguous. What is also confirmatory here is, as we shall see, the description of eclipse phenomena in the same terms throughout in the Vedas. The Biblical analogy is an additional confirmatory evidence.

CHAPTER II

MYSTICISM OF NUMBERS EXPLAINED.

It is to be noted that the interval from one eclipse to another on the same node in successive years is invariably 354 days or 325 days, thus, falling short of the Hindu solar year of 365 days by ten days or by 40 days. It is these ten days that are frequently spoken of as "youthful ten" begetting Agni (solar eclipse) or as "ten sisters urging Soma" forward in lunar eclipses. (Rig. 1, 95, 2; 3, 23, 3). This idea is clearly stated in Rig. 1, 122, 13. The verse is as follows—"We rejoice that for their own satisfaction the ten (days), bearing the twice five ladles of sacrificial food (Soma), proceed to the altar."

Here in the first verse of the hymn a battle between the Devas and the Asuras is mentioned. In the 2nd verse the dawn is described as appearing in her robes (rays) after sun-rise, implying thereby that darkness had set in owing to an almost total solar eclipse, in the constellation of the Asvins, referred to in verse 4. The removal of Ghosha's white-tinted skin, mentioned in verse 5, means the darkness of the moon, it being a new-moon day.

The seven sons mentioned in Rig. 1, 164, 1 are the excess of 7 days over the 33 days in the cycle of 1000 days as shown in the Table of the Cycle of 58 years minus 41 days. The three mothers and the three fathers mentioned in the hymn are the southern and northern Ayanas of the three successive years forming the cycle of 1000 days, the calf being the solar eclipse. The ten referred to in verse 14 are the excess of ten days.

What conclusively proves the use of the eclipse-cycle of 1000 days and also of the cycle of 18 years and ten days in the time of the Rigveda is the fifteenth verse of this hymn. This verse also appears in the Tai. Aranyaka and has been already explained above.

Comparing the art of poetical composition to the artistic construction of a chariot, the Vedic poets take delight in describing the same phenomena in a variety of ways. In 6, 44, 24 the difference of ten days between the solar year and the eclipse year of 354 days is compared to a well with ten water-lifts (daśayantram utsam).

The sixtythree Maruts mentioned in Rig. 8, 96, 10 mean 61 cycles of 1000 days each with six times ten days or 60 days, as one Marut or Vāyu is frequently stated to move with one thousand troops. Krishṇa spoken of in verse 13 of the same hymn is the same Krishṇa that is mentioned in the Tait. Ar. (1, 6) "Iyānah krishṇo daśabhih sahasraih". It is a Krishṇa eclipse, solar or lunar, recurring in a cycle of 10000 days or 20000 days (taking the two nodes corresponding to the two wings of the year)=54 to 60 years or half of it. If Krishṇa or Drapsa, as it is also called, is taken to mean merely an eclipse, then Indra, its slayer, becomes Krishṇa's enemy. If it is, however, taken to mean a driver of the eclipse-demon, then he is a god and friend of Indra.

In 8, 72, 8 the same ten days are spoken of as calling upon Indra to come and drive the cloud, meaning eclipse. The three hues (red, white, and black) mentioned in verse 9 in the same hymn are the colours of the three eclipses occurring in a cycle of 1000 days. The cauldron mentioned in verse 12 is the sun in eclipse; the cows are the rays concealed in the cave of eclipse during the

eclipse. The goat's milk is the Soma-juice, as Soma is called "Aja", goat, and cow's milk is the lustre of the sun. Setting the bull in the liquor means restoring lustre to the moon. "They know their own abode" in verse 14 means that the rays returning after the clearance of the eclipse know the sun, their source. The statement that Agni fills the sky in verse 18 means that the eclipse has completely cleared and the sun is shining in the sky. The wind in verse 16 means 7000 days of the cycle. The seven-stepped one means the moon supplying himself as food to the sun and other gods on the newmoon day.

In 8, 99, 3 we are told that the gathering rays proceed to the sun. This implies that the rays were absent for sometime owing to an eclipse. The word "Marut" in the same verse indicates the cycle of 1000 days.

In 8, 101, 3 Agni is stated to be approaching the Mitra-Varunas, wearing an iron-helmet. Here the iron-helmet is a metaphorical expression meaning eclipse.

The all-beholding destroyer of Rakshasas in 9, 1, 2 is the moon; his golden birth-place is the sun, since he is said to be reborn after death on the newmoon day: his union with Ayohatadrana or Ayohata-drona means his union with an eclipsed sun. Drona or Druna is the sun and Ayas, iron, symbolises eclipse. Śraddha's outstretched hair in verse 6 also implies eclipse. The difference of 10 days between the solar year and the interval from one eclipse to another in two successive years is described as ten sisters in verse 7 of the same hymn.

1. In six years, the difference between 6 solar years and 6 eclipse years amounts to 63 days.

The extraction of Soma-juice by pressing the Soma plant in the sacrificial hall is merely an imitation of the fancied Soma-pressing by the sun and other gods in the sky on the newmoon day. This idea is implied in Rig. 9, 27. 5 which runs as follows:— "The pure flowing exhilarating Soma is abandoned by the sun in the filtering cloth, the sky". Wilson in his Note on this verse says—"Sayana does not convey any very clear sense for this verse; but he seems to imply that the sun performs on a grand scale the same office of diffusing Soma-juice which the priests perform on a small scale in the filtering cloth which is sometimes called the sky." This is fully corroborated by Rig. 3, 29, 13. There we are told that "The mortals have begotten the immortals, the undecaying Agni, the devourer of oblation, the conveyance by which they cross over sin; the ten sisters proclaim him born as if it was a male infant." Here what the verse means is this—men on earth have produced the immortal fire who, devouring the oblation, enables the priests to cross over the sin committed by them. The ten sisters are the ten fingers employed in churning the fire. The corresponding heavenly phenomenon is that the mortal moon has begotten the immortal sun after eclipse which the ten sister days preceeding the solar year brought about. During the eclipse, the sun is believed to be almost dead and the moon to revive him by offering himself as food. Here Agni means a solar eclipse, the cause of which is also the the moon. Hence he is said to have begotten Agni, eclipsed sun.

In Rig. 1, 25, 8 Varuṇa is described as being aware of the twelve months and also of the month which is supplementarily engendered, indicating thereby that

Varuṇa is a name given to the moon. In the Note on this verse H. H. Wilson draws attention to the importance of this passage as "indicating the use of lunar and solar years at this period and the method of adjusting the one to the other." In verse 13 of the same hymn Varuṇa is described as "clothing his well-nourished person, wearing golden armour, whence the (reflected) rays are spread around." In his Note on this verse H. H. Wilson says "This looks as if the person of Varuṇa were represented by an image." The cause of such a description leading to a suspicion of the prevalence of image-worship in the Vedic period is really a total lunar eclipse of "Pinga" colour, as stated in the Tait. Ar., and of Kapila colour, as stated in the Sūryasiddhānta quoted above.

In 9, 41, 5 Soma (the moon) is described as descending "like streams of water driving off the black-skinned" implying the clearance of an eclipse.

In Rīg. 9, 86, 44 Soma is stated to be "gliding out of his old skin" and in verse 45 of the same hymn, he is described as a measurer of days. Here the clearance of an eclipse is described as an occasion for the moon to throw out his old skin and put on a new one. The seven sister mothers mentioned in verse 36 of the same hymn are the seven intercalary months or seven thousand days forming an eclipse-cycle. These seven divisions of the eclipse cycle of 19 years or 18 years and ten days are variously called in the Vedas: 7 Lokas from Bhū to Satya or Vyoma, 7 Dvīpas, 7 streams or oceans, 7 horses, 7 Suparṇa birds, and so on. In his Note on this verse H. H. Wilson says explaining the phrase "seven sister mothers" "seven rivers (the Ganges, Jumna, etc.) clothe

the Soma with their water." The so-called waters (āpah) here are really rays of light. The Tait. Ar. says that "Tejāmsi āpah—waters are really rays of light." Accordingly when the Veda says that "Krishṇam niyānam harayah suparṇa haṇo vasānā divamutpatanti"—"the Suparṇā birds fly to the heaven carrying floating Krishṇa (Eclipsed moon) clothed in water," we have to understand that Krishṇa was clothed in his original light after the clearance of the eclipse. The description of rays of light as clothing is found in Rig. 1, 26, 1 where Agni (a solar eclipse) is addressed to as "Lord of sustenance, assume thy vestments (of light)," where Sayana takes "Vastrāṇi to mean "āchchhādakāni tejānsi," "investing radiance."

In Rig. 9, 89, 2 Soma is described as putting on the vestment of light.

Likewise the seven rivers mentioned in 1, 32, 12, and the ninety-nine streams in verse 14 of the same hymn, the seven mother streams in 1, 34, 8, the three rivers described as being ready in the same verse, the full flow of four rivers mentioned in 1, 62, 6, the thirty lakes of Soma drunk by Indra in 8, 77, 4 and also the seven cities (Purassapta) in 7, 18, 13, are all metaphorical expressions signifying the eclipse-cycle of 7000 days, each minor cycle of 1000 days being regarded as a river, or as a city, or a Loka. The readiness of 3 or 4 rivers means that 3 or 4 cycles of three lunar eclipses each are yet to be passed and that 4 or 3 cycles have already been passed. Thirty rivers signify 30 cycles of 1000 days each with three lunar eclipses in each for Indra's drinking of Soma. The seven-mouthed Rikvans in 9, 111, 1 mean the same cycle of 1000 days. The verse is very interesting as

identifying Soma with the moon, and moon-light with encomiastic or Veda-like splendours. It runs as follows:—"With this bright green-tinted stream Soma being filtered overcomes all enemies with the (juices) yoked to it, as the sun overcomes the darkness with the rays yoked to it; the stream of the effused Soma shines, the filtered green-tinted Soma is resplendent, which *pervades all constellations*, with the Rikvans, with the seven-mouthed Rikvans. "In his Note on the verse H. H. Wilson says "Sayana explains the first Rikvabhih as Stutimadbhih, and the second as Tejobhih, so that the two together may be translated as "with encomiastic splendours." The seven mouths are for taking up the Soma juice "

Here the stream of the effused Soma pervading all constellations is evidently the moon-light; the seven mouths with Rik-songs in praise of Soma in order to entice Soma to enter the cave-like mouths are the seven cycles of 1000 days each with three lunar eclipses in each cycle; the same cycles called caves or hills with Panis or sweet songs attracting solar rays called cows in solar eclipses. The other names of the seven cycles are enumerated in the Rikverse in praise of Agni as follows—

"Seven are thy kindling fuels, seven are thy tongues; the seven sages who are fond of the seven stations together with the seven hotripriests worship thee, O Agni; seven are thy births; refresh thyself with this butter-offering."

Here Agni is the name of the first of the eight Vasu-eclipses. The description of Soma as putting on the vestment of waters (rays of light) and as seeking the stolen cows (rays) in Rig 9, 89, 2-3 is a metaphorical

expression signifying a lunar eclipse. The precious treasure of cows stated to have been discovered by the sages in the cave of the Panis after search again and again in Rig. 2, 24, 6-7 signifies the return of lustre to the sun after the clearance of eclipse. The sun and his lustre are compared in the Vedas to a cow and its calf. Accordingly the statement made in Rig. 1, 110, 8 that the Ribhus (seasonal gods) revived a cow and united it with its calf, means that the sun almost dead, during the eclipse, is revived by god's grace and is made to regain his lustre, the calf. According to a Vedic legend, as we shall see, Saranyu, the wife of the sun, deserted him and lived in a cool and dark region disguised as a female horse. Saranyu is, as we shall see, identified with the dawn. Alluding to this legend the Rig-verse 1, 121, 2 speaks of Indra as making the female horse unnaturally the mother of the calf. Here the re-appearance of the dawn during a solar eclipse is described as her labour to be delivered of her calf, the sun's lustre through the mercy of Indra, the eclipse god. In 1, 36, 8 Agni (sun in eclipse) is compared to a horse neighing for cattle, his rays. When Saranyu, the wife of the sun, became a mare, the sun is also said to have taken the form of a male horse and gone in company with the mare. As horses and cattle are naturally inimical to each other, the poet speaks of the horse's (sun's) longing for cattle (rays of light) as unnatural and therefore a wonder.

The adaptation of one thousand days as a cycle of three solar and three lunar, and especially three lunar eclipses in the same season of successive years, the interval between any two successive eclipses in the same season being about 354 or 325 days, as frequently

observed, naturally led the Vedic poets to determine the exact number of days between any two lunations and half lunations (Parvas). What however troubled them was the difficulty in determining the exact amount of the fraction in which a lunation or half a lunation ended. It is not exactly $29\frac{1}{2}$ days, as assumed in framing the five years cycle of two intercalary months in the Vedāngajyautisha. The number of complete days between any two successive Parvas is however exactly 14 days. This interval they took as a constant and called it Manu. Dividing 1000 days by 14 they arrived at 71 Parvas and $6/14$ ths of a Parva as the measure of the period called Manu. It is this Vedic original simple period called Manvantara that has been magnified as 71 divine Yugas in the Amarakosa, Puranas, and the Siddhāntas. Now 71 and $6/14$ Parvas are the same as 70 Parvas and $20/14$ ths of a Parva, which is the same as 7 times 10 Parvas and $10/7$ ths of a Parva. As this fraction of $10/7$ ths of a Parva yields ten complete Parvas in 7 cycles of 1000 days each, $1000/14 \times 7 = 500$, it is but natural that the Vedic poets should select 7000 days for their big cycle. This big cycle is called Saptapurushas, Saptasuparnas, Saptāśvas, Saptā Devagavyah, Saptaparvatas, Saptalokas, Saptasamudras, Saptasindhus, Saptadvīpas, etc. In a single cycle of 1000 days the number of Parvas is 7 times ten and $10/7$ ths of a Parva. Thus the number 7 is an important factor in their cyclic calculations and came to be regarded as a mother number. As the $10/7$ ths of a Parva yields complete ten Parvas in 7 cycles, the numerator received the designation of ten sisters and denominator 7 mothers. Besides this the same denominator is also called by such names as 7 Marudgaṇas, 7 troops of

Vāyu, each troop being 1000. We frequently come across the description of days and nights as brothers and sisters in the Vedas. In Rig 1, 164 the days and nights of the year are called 720 children. The full moons and new moons are called the wives of gods (Devapatnyah) and are said to produce offsprings in Krishna Yajus 3, 4, 9. There can be no doubt therefore that the numbers seven and ten of the fraction of ten-sevenths of a Parva are called the seven mothers and ten sisters and frequently referred to in the hymns addressed to the Mitra-varunas, the gods of the 7 cycles of 1000 to 7000 days. What is to be noticed here is that the fractional Parvas of each cycle are undeveloped children of Manu and can not have whatever Manu has earned until they are grown up. This idea is conveyed in the legend of Manu's disinheriting a son narrated in a passage of the Maitra S. as follows:—

मनोर्वै दश जाया आसन् । दशपुत्रा नवपुत्राष्टपुत्रा सप्तपुत्रा षट्पुत्रा पञ्चपुत्रा चतुःपुत्रा त्रिपुत्रा द्विपुत्रैकपुत्रा । ये नवासन् तानेक उपसमक्रमत् । येऽष्टौ तान्द्वौ ये सप्त तांस्त्रयः । येषद् तांश्चत्वारः । अथवैपंचैव पंचासन् । ता इमाः पंच दशत इमान्पञ्च निरभजन् यदेव किंच मनोः स्वमासीत् । तस्मात्ते वै मनुमेवोपाधावन् । मना अनाथन्त । तेभ्यः पिता समिधः प्रायच्छत् तामिवैते तान्निरदहन् तामिरेनान्पराभावयन् । परा पाप्मानं भ्रातृव्यं भावयति य एवं विद्वान् एताः समिध आदधाति । अग्नेः समिदसि अभिशस्त्या मा पाहीति अभिशस्त्या एनं पाति । सोमस्य समिदसि परस्या मा एधीति परस्या अस्य भवति । यमस्य समिदसि मृत्योरेनं पाति । एतद्धसवा आह नारदः इदं वावागन्युपस्थानमासेति अभिशस्त्या एनं पाति परस्या अस्य भवति । मृत्योरेनं पाति ।

Mait. S. I. 5, 8.

Manu had ten wives; they had ten, nine, eight, seven, six, five, four, three, two and one son respectively. The one son went along with the nine, the two with the eight, the three with the seven, and the four with the six, while the five remained alone. The five groups of ten sons (whole number) deprived the five sons (fraction) of a share of whatever Manu had as his property. The disinherited five complained to Manu and prayed for their share. He gave them kindling fuels. With those fuels they burned them all and defeated them. Whoever knowing thus burns the fuels overcomes sin and his enemy. He has to put the fuel saying "Thou art Agni's fuel and save me from imprecation," then Agni will save him from imprecation; "Thou art Soma's fuel, save me from my enemy," then Soma will save him from his enemy; "thou art Yama's fuel, save me from death;" then Yama will save him from death. Regarding this burning of fuels, Narada says—"This is the worship of fire, it saves the worshipper from imprecation, enemy, and death."

Here Manu means 14 and his sons are the quotients obtained by dividing 1000 or any other number by 14; the remainder represents the undeveloped sons without share. They will be integral numbers when the denominator "7" disappears at the close the 7th cycle of 1000 days, giving fifty groups of ten sons each. The fuels referred to in the passage are the same threetimes seven fuels mentioned in the Purushasūkta hymn in praise of time personified as Man. Purusha who is stated to measure 1000 in the Maitrayaniya Samhita is said to have seven enclosures and three times seven fuels in the Purusha-hymn (Saptāsyāsan paridhayaḥ trissapta-samidhaḥ kritāḥ). The threetimes seven fuels represent

the three solar eclipses in each cycle of 1000 days repeated seven times in the seven cycles. The 21 eclipses in the course of 7000 days are those occurring only in one of the two halves of the year or one node only. They will be 42 together with those in the other half of the year or the other node, They may not all be necessarily visible in the same locality. The number of lunar eclipses at the rate of three in 1000 days in one node will however be thirty in 7000 days for various reason which it is unnecessary to discuss here.

It has already been pointed out how among other things the number seven denotes so many cows also, not ordinary cows, but divine cows, as other things denoted by seven are all divine. The Maitrayaniya Samhita has a passage on the seven cows and the war waged for on account of them. After enumerating the names of the cows as "1 Vasiyasi, 2 Śreyasī, 3 Bhūyasī, 4 Chittā, 5 Dadhṛishi, 6 Idā, and 7 Sūnṛitā, it says as follows :—

एता वै सप्त देवगव्यः । ताः क्रीतो वैतहोत्रः विदां चकार ।
ताभिरदः कुरूणां कौन्तेः पशूनत्याह्वयत् । ताः कुरवो ब्राह्मणेष्व-
न्वैच्छन् । ताः कुमारवत्याश्वदक्षिणा अविदत् । सोऽब्रवीत् । मा
सूक्ष्यत । एतामिर्वा अहमेता अत्याह्वयिष्यामि । इतराभिरितराः
यानि खलु वा एतासां प्रियाणि धामानि तानि क्रीतः न वेदेति । स
संयत्ते संग्रामे छदिर्दर्श एताभिरेवैता अत्याह्वयिष्यामि । इतराभि-
रितराः । यतरत्र खलु वा एता अत्याह्वयन्ते तत्पशवोऽभिसंक्रामन्ति ।
यत्र पशवः तद्देवाः । यत्र देवाः तदिन्द्रः । यतरान्वा एते अभिसंक्रा-
मन्ति ते जयन्ति ; जयति संग्रामम् ।

Maitra, 5, Gonāmika 4, 2, 6, 6.

These are the seven divine cows. These Vaitahotra (son of fire) had purchased and understood their nature. By means of them he called the cows of Kaunti of the

Kurus to himself. But the Kurus kept them with the Brāhmans. One Āsvadakshinā had them in her possession. He said "Do not grudge. With the seven I shall call those (of yours). She said "why not those (of yours) by means of these (with me); Do you not know that I have purchased the stations which are dear to them? "He said—In the war that ensues for these, I shall by means of these seven call all inclusive of those under a roof. She also said similarly. For, wherever the cows are called, therto all other cows go. Where these cows are, there are the gods; and where the gods, there is Indra; they to whom the cows go will conquer, and he (who knows this) conquers verily in the battle."

Concealment of calves after separating them from the cow is a Vedic metaphorical expression to denote a solar eclipse-phenomena. The calves are the solar rays of light and the cow is the sun. The eclipse is a war between the Devas with Indra at their head and the Asuras of Darkness with Sambara at their head, for the recovery of light. This is what is meant in the above passage. The seven cows are the seven suns of the seven cycles of 1000 days each. Cows, waters, lights, and metres are all used in the same meaning in the Vedas.

The story of Duśśāsana's attempt at rendering Draupadi nude by pulling away her garment is also an eclipse-myth. Drupada is the root of the Pippala tree which is said to have its root in the sky and its branches down below and in which the sun and the moon called Suparna birds are stated to be residing. Draupadi is the sun (Savitri); her rays of light are her garments. The disappearance of the rays during an eclipse is described in the epic story as her garments falling down when pulled away by Duśśāsana. As the sun retains some

light even in a total eclipse, the story says that Duśśāsana failed to render her completely nude.

Finding it absurd that five brothers should marry a single wife, Kumārila, the founder of the Bhāṭṭa school of the Mīmāṃsakas, interprets the myth by saying in his Śloka-vārtika that Draupadi in the tale is sovereignty personified as a woman and that her marriage by the five Pāṇḍavas means the exercise of the functions of sovereignty by the brothers together or in turn. As the five Pāṇḍavas are stated to be the incarnations of the presiding deities of the five constellations, namely—Yamadharma-raja presiding over Bharāṇi; Bhima presiding over Vāyu, Svāti; Phalgunā over the two Phalgunā constellations; Nakula and Sahadeva over the two Asvins, the movement of the sun through all these constellations during each year seems to have been described as her marriage with them.

The tale in the mouth of all people belonging to a sect of Brāhmins that for giving her to wear a slippery garment which actually slipped down from her loins, as expected, when she appeared wearing it before the suppliers of the garment, Nāchiyar (Lakshmi) cursed the suppliers that they should lose their caste and that at their repeated request for mercy, she withdrew the curse on condition of their leaving her vicinity within three days can be explained in the same way.

Nāchiyar is the sun (Sāvitrī); the slipping down of her garment is the loss of light due to the eclipse caused by the moon, who is called Dvijaraja, the best of the Dvijas, Brāhmins. It is a fact that the moon will not remain near the sun for more than three days, the new moon day, and the preceding and following days. It is this eclipse-phenomenon which is implied in the above story.



CHAPTER III

EPIC-MYTHS

THE BIRTH OF THE ASVINS.

In the list of the 27 Nakshatras found in the Yajurveda, the Brāhmaṇas and the Vedāṅgajyautiṣa the Aśvins are the two Nakshatras, 26th in the list. In the Siddhānta works however, the list begins with the Aśvins, which may be identified with Alpha Arietis and Beta Arietis. Their appearance at dawn is thus referred to in the Rig. 1, 34, 10; and 1, 183, 2-6.

Savitar, the sun, sends forth the chariot of the Aśvins before Ushas, the dawn, 1, 34, 10.

With the Ushas, the dawn, the daughter of the sky, the Aśvins are united.

O Aśvins, we have crossed the darkness, come along the paths, by which the gods walk. 1, 183, 2 & 6.

In the above passages the appearance of the Aśvins before sun-rise is clearly stated. In 8, 10, 4 & 5 the appearance of the Aśvins either in the east or in the west according as the month is March (Chaitra) or September (Aśvayuja) is thus referred to—

“Upon whom all sacrifices are dependent.”

Whether, Aśvins, you abide today in the west, or whether opulent in food, you abide in the east,
I invoke you.”

The story referred to in the first passage here is that once upon a time the head of the sacrifice was cut off and that the Aśvins succeeded in replacing it. One explanation has already been suggested. Another explanation that is plausible is that lack of adjustment of the

lunar with the solar year displaces the beginning of the sacrificial season in the equinoctial months, March or September and that the appearance of the Aśvins before sun-rise in the east in Chitra and after sun-set in the west in Aśvayuja marks the arrival of the season. That the Vedic poets used to watch the appearance of the Aśvins in the east before sun-rise is made clear in the story relating to the birth of the Aśvins in Rig. 3, 39, 3 and 10, 17, 1-2—

“The mother of the twins has borne the twins; the tip of my tongue falls, for she approaches; the twins that are born assume form—they, the conquerors of darkness that have come at the foot of the sun.” 3, 39, 3.

Attention has already been drawn to the difficulty in understanding the distinction between the dawn of the air and the dawn of the sky, as pointed out by the late Prof. Max Muller.

The only way to understand the distinction is that the first dawn, the dawn of the air, is the usual dawn; and the second, the dawn of the sky, is the dawn due to the darkness caused by the total solar eclipse. The fullness of the eclipse is evident from the fact that at that time the stars and constellations called gods together with the Asvins in particular became visible. When for the first time the Vedic poets saw the Asvins in this or another cyclic solar eclipse, they seem to have called the Asvins the twin sons of the sun and his wife the dawn and made a story which is narrated in some detail in Rig. 20, 17, 1-2, as follows—

“Tvashtar makes a wedding for his daughter, thus saying, the whole world comes together. Mother of the twins, the wife of the great Vivasvat, the sun, being wedded, disappeared.

They hid that immortal woman from the mortals; making a Savarna woman of the same colour as herself, they gave her to Vivasvat. She bore the two Asvins. She left behind the two (Asvins)—she who is Saranyu, the running woman."

The same story is given in the Brihaddevata as follows—Tvashtar had two children, a daughter Saranyu and a son Trisiras. He gave Saranyu in marriage to Vivasvat, the sun, to whom she bore Yama and Yami. Creating a female like herself with-out her husband's knowledge and making the twins over in charge to her, Saranyu took the form of a mare and departed. Vivasvat in ignorance begat on the female who was left Manu Vaivasvata. But discovering that the real Saranyu had gone away, the sun followed her taking the shape of a horse. From them came the Asvins (having the face of a horse).

The Harivamsa substitutes Manu Vaivasvata and Yama (the planet Saturn) for Yama and Yami as the sons of Saranyu, and says that Savarṇi, the second wife, gave birth to Manu Sāvarṇi and Yama (the god of death). Suspecting her of partiality to her own children, continues the Harivamsa, Yama, the first wife's son, kicked the step-mother. Being cursed by her, he, however, lost his legs and became a Pangu (Sanaiśchara, slowly moving planet).

The story accounts for the discovery and name "Sanaiśchara" of Saturn during the same or another total solar eclipse in the constellation of Asvins. The description of the Asvins as moving at dawn like two horses in Rig. 2, 39, 1, as well as the description of their visibility at dawn in Rig. 1, 30, 20 leaves no doubt

that the Vedic poets were in the habit of determining the arrival of the equinoctial sacrificial season by observing the sun in the constellation of Asvins, the moon being in the constellation of Chitra. The anxiety of all men to behold the great and variegated host of solar rays at dawn and the driving away of Rakshasas, the enemies of Brahma, the sun, by Indra referred to in Rig. 3, 30, 13 and 17 is taken by all commentators as a matter relating to the phenomena of usual nights, dawns, and sun-rise. In that case the anxiety felt by all men to behold the great host of solar rays becomes inexplicable; in the case of an eclipse, however, the feeling of an anxiety to behold the solar rays again can be very well explained. For people in ancient times had no knowledge of the laws of eclipses and thought that it was a great battle between gods and Asuras. Hence it was natural that they should be anxious for the victory of Indra over the Asuras. It is probable that the commentators intentionally explained the phenomena of eclipses as those of ordinary days and nights in order to make the Vedic thoughts mystical and inexplicable and thus augment the sanctity of the Vedas. The concealment of the Vedic eclipse cult seems to have taken place when the eclipse phenomena were explained not as a war between gods and Asuras, but as being due to the shadow cast by the earth on the moon in the case of lunar eclipses and the shadow cast by the moon on the sun in the case of solar eclipses, the three planets being on the same line. The darkness due to an eclipse passed for that of a night and the light after the clearnce of an eclipse passed for that of a day, eclipses like day and night being periodical.

The seasons during which eclipses appeared in the time of the Vedas are (1) the time of equinoxes and (2) the solstices. The two names given to the equinoctial day are Vishuva and Divākirtya. The day of summer solstice is associated with Vishnu's dwarf-incarnation. The track of eclipses travelling along the equinoctial season is different from that of the solstitial season. It is an astronomical fact that the duration of a track of eclipses is about 1150 years when eclipses following the laws of cycles such as 346 days, 18 years and 10 days and so on will recur and cease to appear when the track changes at the close of its duration.

There is no doubt that the track of the Vedic equinoctial eclipses passed through Chitra and Asvins and that of the solstitial eclipses through Makha and Satabhishaj, if not through Purvaphalguni and Purvabhādrapada. Accordingly Bodhāyana says in his *Srautasūtra*, (P. 28, Manuscript No. 282 Oriental Library, Mysore).—"The Krittikas mark the east ; by seeing them in the east the year ought to be closed ; others say that the appearance of Sroṇa (Sravaṇa) in the east marks the close of the year ; some others say that the space between the Chitra and Svāti marks the close." What is implied in this passage is that some followed the practice of beginning the year with one of the two equinoxes, while others began their year with one or the other of the two solstices. The sacrifices and prayers offered on the occasion of equinoctial eclipses are set in a formula and expounded not only in the *Yajurveda* (K. Yajus. 7, 3, 10) but also in all the *Brāhmaṇas* and *Śrautasūtras*. If the Vedic poets were not aware of the cyclic recurrence of eclipses on or near the Divākirtya day, there would have

been no necessity for them to make a formula of sacrifices and prayers for the day. As already pointed out, they had a cycle of 1000 days when three solar eclipse on each node, or six solar eclipses on both the nodes together and six lunar eclipses likewise occur or 21 cows or solar eclipses on each node or 42 solar eclipses on both the nodes put together, and 30 lunar eclipse on both the nodes occur in the course of 7000 days. The immolation of a spotted bull and the singing of Divākirtya or Parassāmans are the chief features of the eclipse incantation on the Vishuva day. The spotted bull is described in the Krishna Yajurveda, 1, 5, 3 as follows :—

The spotted bull hath come

And progressed towards the mother and father
faring to the heaven.

The days of 30 divisions shines,

And speech is set in motion to the *Patanga*.

Here the spotted bull is the eclipsed sun with spots; the mother and the father are the earth and the sky (Dyāvāprithivya); the thirty divisions are the 30 Muhūrtas of the day, and night, both being equal. Patanga is the name of the eclipse and speech is the prayer made by the poets to rescue the sun from the clutches of the eclipse-demon. The Patanga eclipse is described here as a familiar thing, and not as rare sight. The determination of the arrival of equinoctial season was made by measuring the shadow cast by the gnomon and the length of day and night by the number of syllables in the songs recited on the day.

The formula of sacrifices and prayers on the solstitial day with eclipse is described in the Krishna Yajurveda

2, 1, 3-4. The eclipse on that day is described not merely as a battle between the gods and the Asuras, but also as an eclipse by saying in clear terms that the sun did not shine. The mention of Indra and Vritra indicates the cyclic nature of the phenomena and the sacrifices. Vishnu's appearance as a Vāmana, dwarf, on the day implies the dwarfish shadow on the day of solstice.

Like the story relating to the birth of Saturn there is also an eclipse myth regarding the birth of the planet Mercury narrated in the Purānas.—It is this—When Brihaspati (the sun) under whom Soma (the moon) was studying was far away from his home, Soma eloped with his wife, Tāra, and begat on her Budha, planet Mercury. There was a war (solar eclipse) between Brihaspati and Soma for the return of Tāra; and there were gods on both sides. Seeing the danger to the world on account of the war, some gods succeeded in reconciling the contending parties and persuaded Soma to restore Tāra to Brihaspati. In spite of Tāra's bearing Budha to Soma, Brihaspati was persuaded to take back Tāra after she was made to pass through some purificatory ceremony.

This is a myth invented to account for the appearance of the planet Budha with the sun in eclipse. Since the moon is near the sun in a solar eclipse, there came the doubt whether Budha is the son of the moon or of the sun. As the eclipse was looked upon as a war between Brihaspati and Soma, the cause of the war was traced to the elopement of Tāra and the birth of Budha.

The restoration of Brahmajāyā to Brahma, Brihaspati, by Brahmachāri, the moon, forming the subject-matter of Rig. 10, 109 may be taken to be the source of the war between Brihaspati and Soma for the restoration

of Tārā, Bṛhaspati's wife. In this hymn the word Brahmachāri, the Vedic student, is evidently Soma. In A. V. XI, 7, 6 he is described as a student with deer's skin (moon in eclipse) being led to his Guru, the sun, for learning. In the absence of the sun due to a solar eclipse Brahmajāya, the dawn, elopes with the moon and Planet Budha, as her son, is seen for the first time on this occasion of the eclipse. The eclipse is spoken of as a war between the sun and the moon. The gods compelled king Soma to restore Brahmajāyā to Brahma. Brahmajāyā may also be taken to mean solar rays reflected on the moon. According to Yāska (2, 6) it is one ray of the sun called Sushumna which lights up the moon. Reflection of solar rays on the moon is expressly stated in Rig. 1, 84, 15—

"The solar rays found on this occasion the light of Tvashtar, verily concealed in the mansion of the moon."

In his Notes on this verse Wilson says—

"The purport of this stanza is apparently the obscure expression of an astronomical fact, known to the authors of the Vedas that the moon shone only through reflecting the light of the sun; so it is said "the rays of the sun are reflected back in the bright watery orb of the moon", and again "the solar radiance, concealed by the night enter into the moon, and thus disperse darkness by night as well as by day."

The various names given to the moon in the Vedas are (1) bull, (2) King, (3) Viśvarūpa, one of the various phases, and (4) Thrisiras, three-headed, inasmuch as he appears in three different forms in the three lunar eclipses occurring in each cycle of 1000 days, of which the eclipse

called Pinga is nearly circular and total. The resemblance of the three eclipses to the the leaves of the branch of a Palāśa tree is probably the reason that led the ancients to make use of the circular Palāśa leaf as Juhū to take clarified butter and pour it into the fire as Soma. Now in a cycle of 7000 days there are only 30 Soma eclipses, of which only ten are nearly total and circular. These appear to be the ten kings in war with the sun, ten heads of Rāvaṇa in war with Rāma, the solar king, or ten bulls to be sacrificed (Daśagva). In the Rājasūya sacrifice, the Daśapeya Soma cups to be drunk by ten priests also seem to represent the same ten big lunar eclipses. The Dasa-rāja fight referred to in Rig. 7, 83, 6-8 means the same ten lunar eclipses. Though descriptive of lunar and solar phenomena, these myths have received at the hands of the priests some corresponding earthly representations, like the ten fingers representing ten sister days, as already pointed out.

In the Satapatha Brāhmaṇa Soma is identified with the moon. The Brāhmaṇa says—"Soma is the moon and his body is the same as the mountains and rocks; hence Soma is said to grow on rocks."¹ In the same work Soma is also identified with Vritra and is said to be dying and rising to life again. This is what it says—"He then takes a press-stone (Upāmsusavana). Now those press-stones are of rock, and Soma is god, for Soma is in the sky; Soma is also Vritra; those mountains, those rocks, are his body; he thus perfects him; makes him whole; therefore they are of rock; moreover in pressing him they slay him by means of that stone, Soma's

¹ Eggeling's Trans. Vol. 2, P. 100

own body; thus he rises from thence, thus he lives; therefore press-stones are of rock".²

As already pointed out in the Introduction, Vritra is the shadow of an eclipse, solar or lunar. Here by identifying Soma with Vritra the Brāhmaṇa implies a lunar eclipse when the moon is believed to die; and his rising evidently means the clearance of the eclipse. The Soma pressing made by the priests in the sacrificial hall is merely an imitation of the eclipse phenomena.

The Upāmsu, Antaryāma, and other Grahas or Somacups are elsewhere called "Aja," a goat, and "Avi" a lamb, names given to lunar and solar eclipses, as already shown. The word "Graha" is now a name given to eclipses in general. It follows therefore that Soma cups represent eclipses.

The story of Ushā, the grand daughter of Śambara, falling in love with Aniruddha, the grand-son of Kṛishṇa, and carrying him off to Tripura, the three forts of her grand father, and keeping him there as her husband till the couple were released after the destruction of the cities by the arrow of Rudra, is also an eclipse-myth. Here Ushā is the same as Ushas, the dawn. Aniruddha meaning one who is uninterrupted in motion is the sun. The appearance of the usual dawn before sun-rise on the day of eclipse is described here as Ushā falling in love with the ever-moving sun. The appearance of the eclipse after sun-rise is described as Ushā's carrying off the sun to one of the three cities, the eclipse points. The destruction of the city or cities by Rudra with an arrow discharged from his bow means no more than clearance of the eclipse.

² Ibid. Vol. 2, P. 238.

While it is the Tripura that is said to have been destroyed by Rudra in this story, we are told in other eclipse-myths narrated in the Tait. Ar. and the Sata. Brāhmaṇa that Rudra's or Vishnu's own head identified with the head of the Sacrifice was blown off when the string of the bow was cut off by Indra disguised as a white ant. The story is thus stated in the Aranyaka—

दिव्यस्यैका धनुरार्तिः पृथिव्यामपरा श्रिता ।

तस्येन्द्रो वन्निरूपेण धनुर्ज्यामच्छिनत्स्वयम् ।

तदिन्द्रधनुरित्यज्यं अभवर्णेषु चक्षते ।

एतदेव शयोबार्हस्पत्यस्य एतद्रुद्रस्य धनुः ।

रुद्रस्यैव धनुरार्तिः शिर उत्पिपेब । स प्रवर्ग्योऽभवत् ।

तस्माद्यस्सप्रवर्ग्येण यज्ञेन यजते रुद्रस्य स शिरः प्रतिदधाति ।

Tait. Ar. I, 5.

शिरो वा एतद्यज्ञस्य यत्प्रवर्ग्यः —Tait. Ar. V. 47.

यज्ञस्य शिरोऽच्छिद्यत तद्देवा होत्राभिः प्रत्यदधुः Tait. Ar. V. 55

One end of the bow with its string on lay in the sky (the point where the sun's northern movement begins); the other end lay on the earth (the point of southern movement); Indra disguised as a white ant gnawed at and cut off the string; This bow with its string is called Indra's bow and is identified with the celestial arch in its various colours.

The same is called the bow of Samyu, son of Brihaspati. The same is also called Rudra's bow. The end of the bow pressing against Rudra's own head severed it. It (the head) became Pravargya, restorable. Hence whoever performs the Pravargya sacrifice restores Rudra's head. What is called Pravargya is verily the head of sacrifice itself; for it is the head of the sacrifice that is

cut off and the gods restore it by sacrificial acts called Hotras." Tait. Ar. 1, 5 ; 5, 47- ; 5, 55.

The Satapatha Br. substitutes Vishṇu for Rudra and says that Vishṇu's head was cut off. A little knowledge of astronomy so far as it relates to eclipse phenomena will enable us to understand the riddle of the above passage. We know Vishṇu is the sun and that Rudra is used in the sense of the summer sun and at other times in the sense of Śiva having the moon on his head. The bow is the ecliptic of the sun and the string is part of moon's Orbit. The ends of the bow are the two nodes. When the sun and the moon are at the same distance from any end of the bow, the perpendicular distance between them is called the arrow, Sara; when the string is cut off, the bow is lengthened a little and the broken string becomes merged in a line with the bow, bringing the sun and moon on a line quite close to each other, if it were a new moon day, or 180° apart from each other, if it were a full moon day. In the former position, there occurs a solar eclipse, and in the latter a lunar eclipse. A solar eclipse is spoken of as the severance of Vishṇu's head or Samyu's head, Samyu, the son of the sun who is also called Brihaspati. Likewise a lunar eclipse is called as the severance of Rudra's head. For Chāpa (bow), Jyā (string) and Śara (a perpendicular drawn from the bow to the string) are the very words used in the astronomy of both the Jainas and the Brāhmins to denote the three sides of a spherical triangle. Here the bow and its string are the parts of the ecliptic and the orbit intercepted between the two nodes and the arrow is the least perpendicular distance between them, the bow and the string nearer to one of the nodes, as shown in the

figure.¹ The ratio of bow, string and arrow to one another is thus stated in the Trilokasāra and also in the Līlāvati—

जीवा विक्खंभाणं वग्गविसेसस्स जम्मूलम् ।

तं विक्खंभा सोह्य सेसद्धमिणुं विजाणाहि ॥ Trilokasara

जीवविक्कंभयोर्वर्गविशेषस्य यन्मूलम् ।

तद्विक्कंभात् शोधित्वा शेषार्धमिणुं विजानीहि ॥

ज्याव्यासयोगान्तरघातमूलं व्यासस्तदूनो दलितश्शरस्यात् ।

लीलावती.

The meaning is this:—

Take the square root of the difference between the squares of the Jyā and the diameter; deduct the square root thus found from the diameter again and find the remainder; half of this remainder is the measure of the Sara under consideration.

Let ABCD be a circle, O its centre, DB a Jyā, AH a Śara, AHOC its diameter, and OB a radius.

Evidently BHO is a right-angled triangle, BO being the hypotenuse. Hence HO^2 is equal to $BO^2 - BH^2 = (BO + BH)(BO - BH) = \frac{(2BO + 2BH)(2BO - 2BH)}{4}$ where $2BO$ is diameter and $2BH = DB$, the string. Hence Square on HO is equal to one-fourth of the difference between the squares on the diameter and the string. Hence HO is equal to the half square-root of the difference between the squares on the diameter and the Jyā. Let us call it $\frac{1}{2}X$. But AH is equal to $AO - HO = \frac{1}{2} \text{ diameter} - \frac{1}{2}X = \frac{1}{2} \text{ diameter} - (\frac{1}{2} \text{ diameter} - \frac{1}{2} \text{ Jyā})^2$.

Here ABH is a spherical triangle, the side AB is a part of the ecliptic, BH is the moon's orbit, cutting the

¹ See the Appendix for the figure.

ecliptic at the ascending node; AH, called Sara, is the measure of angular distance of the planets from the node. As the planets come nearer and nearer to the node, the Sara becomes less and less. If the Sara and the Jyā vanish, the planets will be at the node, and if it be a new moon day, there will be a total solar eclipse, which is expressed in the Vedas as Vishnu's head obscured or cut off. If, however, it is a full moon day and the earth comes between the sun and the moon 180° apart, it is the head of Rudra that is obscured or cut off, for Rudra has the moon on his head.

As already pointed out, Indra is the god of the 7th intercalary month closing a 19 years' cycle of eclipses. He is also a god with power to destroy the demons of eclipses. By cutting the Jyā and the Sara, he makes the distance of the planets from the node nil and thus causes a total eclipse and also its clearance. When thus Chāpa, (bow) Jyā, (string), and Śara (arrow) are used to determine an eclipse in the astronomical works of the Hindus, how can it be denied that the same terms when used in connection with obscuration of the sun and the moon imply eclipse phenomena?

Likewise the story narrated in Rig. 10, 102 of Mudgala and his wife Mudgalānī recovering their cattle carried off by thieves is a myth based upon a solar eclipse. Mudgala is the sun and Mudgalānī is the dawn, his wife. The cattle are the rays of light and the old ox is the lingering ray left with the sun during the eclipse. The club is the moon, as he appears in the form of a club (Danda) soon after the new moon day. The verses in English translation are as follows—

May (Indra) by his prowess protect thy waggon (Mudgala) that has no companion; defend us, O invoked of many, in this memorable conflict for the recovery of our wealth. 1

The wind raised her vesture when she (Mudgalānī) won a thousand waggon-loads. Mudgalānī was the charioteer in the quest of the cattle; the army of Indra recovered the (spoil) taken in battle. 2

Restrain, Indra, the thunderbolt of the malignant threatening (foe); ward off, Maghavan, the secret weapon (of our foe), be he Dāsa or Ārya. 3

Rejoicing, he drank up the pool of water, he cleft the mountainpeak, he went against the enemy; endowed with vigour, eager for fame, assailing the quick moving (foe), he seized him with his two arms. 4

Approaching the bull, they made him roar in the midst of the battle. I, Mudgala, have thereby gained in war hundreds and thousands of cattle well-pastured. 5

The bull has been yoked for the destruction of the enemy; his long-haired yoke-fellow made him roar; rushing on with the waggon of the irresistible yoked bull, the warriors coming forth went to Mudgalānī. 6

The sage (Mudgala) has fitted up the frame of the waggon, he has harnessed the bull, training him to his work: Indra protected the lord of the inviolable (cows), the buffalo rushed along with speed. 7

Wielding the goad (Indra) with braided hair proceeded happily, fastening the strap to the wood (of the waggon); caressing the oxen he acquired vigour. 8

Behold this club, the ally of the bull, resting in the midst of the conflict, with which, I, Mudgala, have won hundreds and thousands of cattle in war. 9

Who has thus beheld the evils nigh at hand? The bull which they yoke they stop; to him they bring neither fodder nor water; being above the bull he bears the chariot-pole announcing (victory to his lord). 10

As a wife who has been abandoned rejoices to find her husband, as a cloud expanding when pouring forth rain with the aid of the earth's disc; with her eager (to recover the cattle) for our charioteer, may we win (the prize), may good fortune together with food be given to us. 11

Thou, Indra, art the eye of the eye (sun) of the whole world, when showerer (of benefits) urging on thy two vigorous steeds harnessed to the car, thou engagest in battle. 12

Here, first, Mudgala (the sun) appears on the horizon; Consequently Mudgalānī (the dawn) loses her vesture, lustre, and disappears. Then darkness due to the eclipse comes on, covering the sun, when the dawn re-appears and is met with by the dark warriors. Gradually the eclipse disappears and Mudgala recovers his inviolable cows, the rays of light. Indra's braided hair is eclipse. Thus after recovering the rays of light metaphorically spoken of as cows, the sun rests in the midst of the sky, the battle field, with his club, the moon. The abandoned wife is the dawn who helps the sun in the recovery of the light. Indra is identified with the sun by saying that he is the eye of the sun who is the eye of the whole world. This story reminds us of the later Rāmāyaṇa story of the help which Kaikeyi rendered to her husband Daśaratha by engaging the Rākshasas in war till Daśaratha recovered from his swoon and resuming the war against the enemy overcame them. The rest of the story regard-

ing the boons granted to her by her husband for the help is evidently a later embellishment.

THE EXPLOITS OF THE ASVINS

The *Āśvins* are spoken of in the *Vedas* as having supplied milk to the barren cow ; (2) raised *Rebha* and *Vandana* from water ; (3) given light to *Kanva* ; (4) rescued *Āntaka* from a deep pool ; (5) rescued *Bhujyu* from ship-wreck ; and (6) restored youth to *Chyavna* to whom *Sukanyā* was attached. (*Rig.* 1, 116, 10).

It is a canon of eclipses that solar or lunar eclipses recur in the same locality—longitude and latitude—after an interval of 18 years and 10 days, and that this recurrence continues for nearly 1100 or 1150 years when the track changes. Accordingly the recurrence of eclipses in the region of the *Asvins* in the time of the *Vedas* seems to have been regarded as the treatment and restoration of the eclipsed planets by the *Asvins*, who were therefore regarded as the physicians of the gods.

The barren cow is the sun under an eclipse ; supply of milk means the restoration of light to the sun after the clearance of the eclipse.

Rebha and *Vandana* are the sun and the moon eclipsed at the time of setting, which is described as sinking in water ; their rise near the *Asvins* the next day is described as raising them from water. Giving light to *Kanva* is giving light to the sun after the clearance of a solar eclipse.

Antaka is the moon ; the setting of the eclipsed moon is his fall into a deep pool ; and his rise the next day is his rescue.

Bhujyu is the same as Bhojya, edible, the moon; rescuing him from a ship-wreck means the clearance of a lunar eclipse at midnight, the sky being regarded as an ocean.

Chyavana is the moon and Sukanyā is the sun; restoring youth to the moon means his growth from crescent to full moon under the treatment of the Asvins.

URVASI AND PURURAVAS.

The following extract from the Satapatha Brhman is from Prof. Max Muller's Chips Vol. 2 :—

"Urvasi, a kind of fairy (Apsaras), fell in love with Pururavas, the son of Ida, and when she met him, she said: "Embrace me three times a day, but never against my will, and let me never see you without your royal garments, for this is the manner of women." In this manner she lived with him a long time and she was with child. Then her former friends, the Gandharvas, said: "This Urvasi has now dwelt a long time among mortals; let us see that she has come back." Now there was a ewe (Āvih) with two lambs tied to the couch of Urvasi, and the Gandharvas stole one of them. Urvasi said: "They take away my darling, as if I lived in a land where there is no hero and no man. They stole the second, and she upbraided her husband again. Then Pururavas looked and said: "How can that be a land without heroes and men where I am? And naked¹ he sprang up; he thought it too long to put on his dress."² Then the Gandharvas sent a flash of lightning, and Urvasi saw her husband naked as by day light. Then

¹ Devoid of light. ² Till full moon-day.

she vanished. "I come back" she said and went. Then he bewailed his vanished love in bitter grief, and went near Kurukshetra. Then at last her heart melted and she said: "Come to me the last night of the year,"⁸ and then thou shalt be with me for one night, and a son will be born to thee. He went the last night of the year to the golden seats and while he was alone, he was told to go up and they sent Urvasi to him.

According Rig. 10, 95, 4 Urvasi gives wealth and food to her Śvaśura, father-in-law, and then wishing for the company of her husband goes from Antigriha, the near house, to Asta, the house of her husband, where they love each other.

The story can be very well explained in the light of solar and lunar eclipses. Here Urvasi is the sun's Light reflected on the moon; and Purūravas is the moon, as the moon is regarded as Martya, man, according to Rig. 1, 150, 3 and as he is spoken of as being born again and again in the beginning of the light half of every month. As pointed out elsewhere Avi means a solar eclipse of lower digits; the Gandharvas are the semi-divine beings causing eclipses. The disappearance of an Avi means a solar eclipse when the moon being near the sun on the newmoon day has no lustre. Hence the disappearance of Urvasi from the moon on the day. The moon's golden seat is the sun with whom he comes in conjunction. The Asta-griha is the western horizon and the Anti-griha is the eastern horizon. Urvasi's father-in-law is the sun to whom she gives the food, meaning the moon, on the newmoon day. The moon is said to be naked when he has no lustre either on the newmoon day or on the occasion

⁸ Purnimanta year.

of a lunar eclipse, since light is spoken of as a garment in the Vedas. Accordingly it is clear that Urvasi, light, quits the moon on the new-moon day and also on the occasion of a lunar eclipse.

In verses 9, 10, 11, 12 the birth of Vasishtha, from the combined seed of Mitra and Varuṇa, his movement in the thousand-branched world and the birth of Agastya, Canopus, are all alluded to. "By the wisdom seated in the heart, the Vasishthas traverse hidden the thousand-branched world (*Ninyam sahasravalśam abhisamcharanti*) and the Apsarasas sit down weaving the vesture spread out by Yama, (*Yamena tatam paridhim vayantah apsarasah upaseduh*).” Here the thousand-branched world is the cycle of 1000 days; Mitra represents solar eclipses and Varuṇa the lunar in the cycle of 1000 days; The Apsarasas are the female spirits causing eclipses, the Gandharvas, their husbands, being the male spirits. Paridhi means an enclosure of 1000 days and the number of Paridhis are, as stated in the *Purushasūkta*, seven (*Saptāsyāsan paridhayah*). As Vasishtha is the son of both the sun and the moon, in some Suktas Vasishtha is used in the sense of "sun" and in others in the sense of "moon". Yama is probably the Nakshatra, Bharāṇi presided over by Yamā; and as the Bharāṇi constellation is near the Asvins, the solar and lunar eclipses referred to in the hymn made that constellation and also Agastya visible during the eclipse.

The story of Vāmadeva referred to in *Rig. IV, 18* and also the dialogue between him and Indra found in the same hymn is also an eclipse myth. Here Vāmadeva is the moon to be born after the new moon when a solar eclipse happened. As the sun is spoken of as the wife of

the moon, the sun of the new moon is the mother of the crescent moon who comes out along the side of the sun and not at all through the body of the sun. The various exploits of Indra mentioned in the dialogue have already been made clear.

THE STORY OF APALA

Apāla, the daughter of Atri, being afflicted with a disease of the skin, was repudiated by her husband; she returned to her father's hermitage, and there practiced penance. One day she went out to bathe intending to make a Soma offering to Indra, and as she was returning, she found some Soma plants in the road. She gathered them and ate them as she walked. Indra hearing the sound of her jaws, thought it was the sound of Soma-stones, and appeared to her, asking whether there were any Soma stones bruising there. She explained the reason of the sound, and Indra turned away. She called after him, "why dost thou turn away; thou goest from house to house to drink the Soma, now then drink the Soma ground by my teeth and eat fried grains of barley." She then added without paying him respect, "I know not whether thou art Indra, but if thou comest to my house, I will pay thee due honour." Feeling however sure that it was really Indra, she addressed the latter half of the third verse to the Soma in her mouth—"O Soma flow forth for Indra first slowly and then quickly." Indra then falling in love with her, drank the Soma, as she wished. (Verse 4) "May Indra repeatedly make us powerful, may he do abundantly for us, may he repeatedly make us rich, often hated by our husband and forced to leave him, may we be united with Indra. I have been

repudiated by my husband, and yet Indra comes to me." Indra then granted her a boon and she thus chose: "These three places—do thou cause them all grow—my father's bald head, his barren field, and my body." Indra granted the three boons. In his commentary on the 7th verse Sāyana says that Indra dragged her through the wide hole of his chariot, the narrower hole of the cart, and the small hole of the yoke, and cast off three skins. The first became a hedgehog, the second an alligator, and the third a chameleon. The hole or space of the chariot and cart represents the opening between fore-wheels, the hole of the yoke seems to mean the opening through which the animal's head is passed."

The three lunar eclipses of three different sizes occurring in each cycle of 1000 days are the three skins which Soma casts off and which in their varying sizes are such as to pass through the hole of a chariot, a cart, and a yoke. Apāla is therefore a malevolent spirit of eclipse which in colour resembles night. The husband of night is the moon (Nisāpati) and accordingly he is also the husband of eclipse. On account of her skin-disease she is cast off by the moon. When she devours the moon during the time of eclipse, Indra hesitates to accept her invitation, and as he is the lord of eclipses he complies with her request and drinks Soma presented by her.¹

In Rig. 7, 33 three eclipse stories are alluded to. In verse 2 Indra is said to quit Pāśadyumna's sacrifice offered by the sons of Vasishṭha. Indra's appearance successively but not simultaneously at different sacrifices offered in different localities implies that the beginning

¹ See Rig. 8, 91, 1-5-7. Compare Rig. 9, 86, 44.

and ending moments of eclipses were different at different localities in accordance with the canon of eclipses.

In verse 3, he is stated to have defended Sudas in his war with ten Kings. The ten Kings are, as already pointed out, ten total or nearly total lunar eclipses occurring in 7 cycles of 1000 days each. Sudas means wealth-giver; he is the sun, since his rays are metaphorically described as Vasu, wealth. A lunar eclipse is really a war between the sun and the moon. In Rig. 4, 24, 10 Indra is offered in sale for ten milch cows, the time of pledge being the total destruction of the pledgee's foes by Indra. Here the ten milch cows represent ten solar eclipses and their time is one cycle of 7000 days, since in each cycle of 1000 days there are three solar eclipses, visible or invisible in the same locality, and one of them being of a greater size than the other two.

The story of King Tryarūṇa and Vrisha, his Purohit :—

The story, as narrated by Wilson is as follows :—

“ Rāja, Tryarūṇa, the son of Trivriṣhaṇa, of the race of Ikshvāku, had for priest Vrisha, the son of Jarā. It was the custom, it is said, when a Raja and his Purohit went out in the same chariot, that the latter should drive, and on one occasion of this kind the chariot went over a Brāhman boy who was playing on the road, and killed him; a dispute ensued between the Rāja and the priest as to which was the murderer; the former accusing the latter because he was driving, the Purohit retorting that as the chariot was the Rāja's he was the responsible person: they referred the matter to an assembly of the Ikshvākās who decided against the Purohit; Vrisha

restored the boy to life by the prayer thenceforth called after him the Vrisha-Sāman, but being offended with the Ikshvākus for what he considered their partiality, fire thenceforth ceased to perform its functions in their dwellings and cooking of their food and other offices ceased: attributing this to the displeasure of the Rishi, the Ikshvākus respectfully invoked his presence, and with the same Mantra he prayed that the energy of fire would be restored to them, which accordingly took place. This energy or activity is designated by the unusual term Haras, Agnerharas; so far the legend is intelligible, but what follows is rather obscure: Sāyana proceeds: so saying, the Rishi having seen distinctly the Brāhmanicide become the wife of king Tryarūṇa in the garb of a Piśāchi, and that she, having taken the Haras away from the fire-chamber, was concealing it in her regal clothing (Kasipu) he, having propitiated that Haras by the Vrisha-Sāman, reunited it with Agni; upon which the office of fire in cooking and the like, were discharged as before. Sāyana adds to his version a quotation from the Tāṇḍya. According to the Brihaddevata Haras is the boy.

(The mother is the two pieces of touchwood, which retain fire, the child, and will not spontaneously give up to the father, the Yajamāna, until forced by attrition.)

The Rigvedic verses suggestive of the story are V, 2, 1, 2, and 9.

"The young mother cherishes her mutilated boy in secret, and gives not up to the father: men behold not his mutilated form, but (see him) when placed before them in an unresting (position). 1

"Young mother, what boy is this whom thou, a malevolent spirit, fosterest? The mighty (queen) has given him birth; the embryo has thriven through many years; I have seen him born, as the mother brought him forth. 2

Agni shines with great and varied radiance; he makes all things manifest by his light; he overcomes undivine delusions; he sharpens his horns for the destruction of the Rakshasas." 9

Here the king is the moon; the sun in one aspect is the priest; and another aspect is the mother; the malevolent spirit is the solar eclipse personified as a female spirit; the mutilated boy is the newly born and yet unseen crescent moon; the boy in unresting position is also the crescent moon; Fire not burning or not discharging its offices is the sun in eclipse. The Rakshasas are the demons of darkness during the eclipse. Haras, the boy, is the sun-light reflected on the moon.

THE STORY OF DADHYANK.

Dadhyank, the Purānic Dadhīchi, was a Rishi who learnt the art of Madhuvidyā, (the art of making honey) and also the Pravargya-vidyā (the art of replacing the cut-off head of the Sacrifice, identified with Rudra as well as with Vishṇu. Though he was warned by Indra who imparted the two Vidyas to him that if he were to impart the Vidyas to any one else, he would be beheaded, he taught them to the Aśvins on their promising that they would restore him to life, if he were beheaded. Indra came to know that he revealed the Vidyas to the Aśvins and at once beheaded him. But the Aśvins restored him to life again. Once thereafter Indra wanted to see

Dadhīchi for a piece of his bone to kill Vritra and after great search he succeeded in finding him and getting a piece of his bone with which he killed Vritra. This story is alluded to in Rig. 1, 84, 13 and 15.

Here Dadhyank is the moon who shines like Dadhi, curds. His bone is the seventh limb, as every physical body is regarded to be consisting of seven elements, such as, Rakta, Asrik, Māmsa, Majjā, Medah, Vasā, and Asthi. Vritra is the seven intercalary months spoken of as seven hills, seven rivers, seven islands, etc. Madhuvidya is the knowledge of the arrival of the spring season which for want of adjustment of the lunar with the solar year would be thrown off from its usual place in the year. The head of the sacrifice is the beginning of the sacrificial work either in the beginning of the equinoxes or of the solstices after due adjustment of the lunisolar year. The astronomical fact referred to in verse 15 has already been explained elsewhere. Indra's killing ninety-nine Vritras means the adjustment of seven intercalary months 99 times in the course of 99 times 19 years, just as the destruction of 99 forts of Sambara by Indra means the recurrence of a solar eclipse of the nineteen years' cycle ninety-nine times, each cycle terminating with the re-appearance of the Asvins in the spring season, or the re-appearance of the Makha Nakshatra at the commencement of the summer season.

Now it is easy to understand that the Vedic myths, as interpreted on the basis of eclipse-cult, are unmistakably the sources of the later Epic and Purānic stories. This fact gives an uninterrupted and continuous growth to Indian culture from the Vedas. Thus the Vedas are explained by Epics and the Puranas which are in their turn

explained by the Vedas. This idea of Indian culture being a single whole and not a hybrid of two different cultures—a Vedic culture and a Purāṇic culture—is not a new ingenious invention, but as old as, if not older than, the Purāṇas themselves. For it is echoed in the Purāṇic verse—“पुराणैरितिहासैश्च वेदार्थमुपबृंहयेत्.” “With the light of the Puranas and the Epics the Vedas should be explained and their meaning expanded.”

AYODHYA, THE CITY OF THE GODS.

Many regard the story of the Rāmāyaṇa as historical and locate the various scenes of the Epic in the cities, hills, dales, and other parts of India. Many point with pride and reverence to some parts of southern India as Kishkindha, to some hills as Matanga, and to some other mountain as the Rishyamūka and produce in support of the identification old local chronicles called Sthalamāhātmya. Though Ceylon formed part of the main land of the Indian continent in early times, many regard Ceylon, now an island, as Lanka, the capital and country of Rāvaṇa, and identify as Rāma's Setu or bridge the partly submerged sandy tract connecting Rāmeśvara with Ceylon. In the island itself some garden is pointed out as Aśoka, the pleasure park of Rāvaṇa where Sītā is said to have been kept as a captive.

But the Taittirīya Āraṇyaka which is a better authority than any local chronicle tells us a different tale. It locates Ayodhyā in the terrestrial globe and calling it the city of the gods assigns to it eight out of the twelve divisions of the ecliptic circle and the remaining four parts to the Daṇḍaka forest and Lanka, the abode of the Rākshasas. The original passage runs as follows :—

अष्टा चक्रा नवद्वारा देवानां पूरयोध्या ।
 तस्यां हिरण्मयः कोशः स्वर्गो लोको ज्योतिषावृतः ।
 यो वै तां ब्रह्मणो वेद अमृतेनावृतां पुरीम् ।
 तस्मै ब्रह्म च ब्रह्मा च आयुः कीर्तिं प्रजां ददुः ।
 विभ्राजमानां हरिणीं यशसा सम्परीवृताम् ।
 पुरं हिरण्मयीं ब्रह्मा विवेशापराजिताम् ॥

Tait. Ar. I. 27.

त्वाष्ट्रीं मायां वैश्रवणः रथं सहस्रवन्धुरम् ।
 पुरुश्चक्रं सहस्राश्वं आस्थायायाहि नो वलिम् ॥

Tait. Ar. I. 37.

Ayodhyā, (impregnable), the city of the gods, consists of eight circles (also cycles) and nine entrances ; within it there is the golden treasure-dome, the celestial world, ever-illuminated with light (north pole). Whoever knows it as the Creator's city ever-surrounded with nectar will have long life, fame, and offspring bestowed on him, by Brahmā, (the sun), and Brahma, (the moon). Into this city ever shining, moving, and pervaded with Yaśas (fame and lustre) the Creator has entered.

May Vaiśravaṇa, (known as Kubera, Lord of the Yakshas, Rākshasas, and Gandharvas), mount his chariot of thousand parts and a thousand horses and many wheels, which is the result of Tvasṭrī's magical art, and come to receive our sacrificial offering (for averting eclipses, or attacks made by Rākshasas on gods).

This Ayodhyā city is of two kinds, microcosmic and macrocosmic. The human body is an Ayodhyā city of eight circles, namely, (1) Mūlādhāra, (2) Maṇipūra, (3) Svādhīsthāna, (4) Anāhata, (5) Viśuddhi, (6) Āgnā, (7) Sahasrāra, (8) Bindu-Trikona or Śiva-śakti in the

Sahasrāra. Macrocosmically it is the terrestrial sphere having two divisions, one of eight circles and the second of four circles. The first division is called the Ayodhyā City. In this the eight circles are (1) the evershining north Pole, (2-8) are the seven monthly circles, presided over, or illuminated by, the seven Adityas, Kasyapa being the eighth at the Pole. In the celestial sphere the seven circles are those of the Seven Bears with Dhruva or Pole-star as the eighth. (A. V. 10, 8). The seven terrestrial circles also bear the seven names—(1) Bhū, (2) Bhuvah, (3) Suvah, (4) Mahah, (5) Janah, (6) Tapah, and (7) Satya, and also the seven Dvīpa-names, as (1) Jambu, (2) Plaksha, (3) Kuśa, (4) Krauncha, (5) Sāka, (6) Śālmali, and (7) Pushkara. They also were called the seven oceans, seven rivers, and seven Svaras of the gamut. The seven circles bore also the name of Devaloka, Saptapurushas, and seven Eagles. The other four or five circles of Vaiśravaṇa bore the name of Rākshasa-lōka, Night-world, and five Mothers. Later on the eight Chakras making up Ayodhyā were reduced to seven and correspondingly the Chakras of the Vaiśravaṇa division of the globe were raised to five. The sacrificial animals assigned to the seven Chakras are the cow, sheep and other domestic animals, while those of Vaisravaṇa circle are wild animals corresponding to the wild nature of these five Chakras.

Expressed in terms of time the eight Chakras represent the cycle of 20 years made up of eight minor cycles of $2\frac{1}{2}$ years with one intercalary month each (see the Vedāṅgajyautisha on $2\frac{1}{2}$ years' cycle). The seven months were regarded as being presided over by seven Adityas and the eighth Aditya named Mārtānda (born of

lifeless egg) is cast out. The seven Adityas who are the lords of the seven intercalary months occurring in the cycle of 20 years reduced to 19 years are distinct from the sun or suns presiding over the ordinary months.

The whole of the above twelve intercalary month-circles evidently forms a cycle of 33 years divided into two parts, one part of 19 years with seven intercalary months and a second part of 13 years with 5 intercalary months called Rākshasa-loka as contrasted with the name of Devaloka given to the division of 19 years. Thus $19 + 13$ years + 12 months make up 33 years. The intercalary year is called Adhi-samvatsara in the Tait. Aranyaṇa. The cycle of 20 years which is one-third of the 60 years' cycle beginning with Prabhava and ending with Akshaya is also referred to there in the very beginning of the work.

Rāma, the son of Dasaratha, the friend of Indra, is an incarnation of Vishnu, the sun-god. He lives in Ayodhyā which is formed by the seven intercalary month-circles and becoming 19 years old, he leaves it at the behest of his father for the forest world of Dandakā and Lankā. He wanders there for 14 years. Reaching Lankā on or near the equator, he destroys the Rākshasas and Rāvana, their chief, and returns at the completion of 33 years to Ayodhya or the Devaloka. The same work is repeated in every cycle of 33 years. This is the original real Kalpa which the authors of the Purāṇas and the Siddhāntas magnified into 4320000 years. The word Zodiac seems to be philologically akin to Ayodhyā. Accordingly the story of the Rāmāyaṇa appears to be a development of an early Zodiacal myth.

¹ See also the stories of Mudgala and Brahmajyā.

CHAPTER IV

THE VEDAS AND THE BIBLE AND KORAN

Uniform is the thought and feeling of mankind all over the world. Science and religion are two special forms of thought. Uniformity in scientific thought all over the world needs no demonstration. There is no local or racial difference in the results arrived at in arithmetical problems of addition, subtraction, multiplication, and division, nor in the results realised by chemical analysis or synthesis of substances, nor in the effects of action and reaction of heat, light, electricity, magnetism on bodies. But contrary to the general principle of uniformity of thought, religious thought seems to vary with each nation. Taking different forms, it appears to run on parallel and antagonistic lines. Hinduism inclusive of Buddhism and Jainism, Chrischianity, and Mahamadanism are the three great religions, now opposed to each other. But at close examination of their history, as presented in their respective scriptures, they seem to have a single or uniform source and point to uniformity of thought also underlying religious thought. A careful study of the story of the first parents of the world which is common to all these religions supports this view.

The story of Adam and Eve, the first parents of mankind according to both the Bible and the Koran, is too well known to need a description here. Faith in the existence of a first couple is also affirmed in both the Vedic and classical Sanskrit literature, though the names of the first pair are not known as Adam and Eve. In the Vedas and especially in the Tait. Āraṇyaka Dyāvā-

prithivī, the sky and the earth, are called the first parents. At the very commencement of his *Raghuvamśa*, Kālidāsa says that Pārvati and Parameśvara are the first parents of the world. In his *Śakuntalā* he describes Parameśvara as a cosmic force consisting of the sun, moon, the five elements and the immortal soul, eight in all. Pārvati is half of this cosmic body. Bhāskara-rāya quotes in his *Varivasyarahasya* an Agamic verse implying that the sun and the moon are the first parents of the world. An English translation of the verse is as follows :—

“ Desirous of creating the world the Creator looked towards Sakti, his consort. The result was a white drop. Into this moon (namely, the white drop) Sakti entered taking the form of a red drop. These two drops or Bindus, as they are called, constitute Visarga (Emission and also Visarga symbol). Another name by which Visarga is known both in the Vedic and Tantric literature is Agnīshomiya (Agni, the fire and the sun, and Soma, the moon). In the Tantric literature Visarga means not merely creative energy, but also the Visarga symbol of the Devanāgarī alphabet, which represents the creative energy. Even now in all the Indian alphabets the Visarga symbol is written as two dots placed one below the other. The other ideographic symbols of the Tantric cult are a triangular symbol representing Sakti, the Linga symbol consisting of a line drawn between two dots, which is now written as a cross, and the Tryambaka or Bindutraya symbol consisting of three dots placed at the angular corners of a triangle. These three dots are regarded by some as the symbols of the three eyes of Siva, and as the face and the two breast nipples of Sakti by others. The triangular graph became later the “E”

letter of the Sanskrit alphabet and the Linga symbol "Ka." The three dots became "I." This is exactly the form in which the Brāhmi alphabet is found in the Asoka script. A full description of this is given in my Theory of the origin of the Devanāgarī Alphabet published in the Indian Antiquary for 1905-1906.

Again the words "Manuja, and Mānava" mean the origin of mankind from "Manu," which, as I have shown in my "Vedic Cycle of Eclipses" is a name of 71 or 72 solar and lunar eclipses that occur in the course of 20 or 19 years constituting the so-called Metonic cycle of eclipses. It is an ancient belief referred to in the Vedas that the union of the sun and the moon on the new moon day is the cause of legitimate human birth. Solar eclipses were regarded, on the other hand, as the cause of double seed and therefore of illegitimate birth. The Mantra recited by every Brāhman while performing an oblation of clarified butter into the fire on the day of his ancestral anniversary rite is a prayer to god to avert the cause of such double seed and illegitimate birth.

Verses 20-22 of Rig. 1, 164 furnishes some more details about the abode, life, occupation, of the first couple referred to above. The verses can be translated as follows:—

Two companion Suparṇa beings (birds) have embraced the same tree; one of them eats the sweet fruit (Svādu Pippala), and the other shines well without eating. 20

Where the Suparṇas praise with ever wakeful eyes the share of Amrita, there is the lovely protector (Gopa) of the world, who has entered into me. 22

The tree in which the Suparṇas are eaters of sweet honey, in which they have their abode and *generate offspring*, upon its top they say is the sweet fruit ; *none who knows not the father eats of it.* 22

Though the Vedāntic commentators have taken the word "Suparṇa" to mean Paramātmā, universal soul, and Jivātmā, individual soul, there is no doubt that the original meaning of the word is the sun and the moon. According to the Vedānta the sun is the seat of Paramātmā and the moon of the individual souls. In the Vedas the sun and the moon are frequently described as two winged birds. Of these two, one, the moon, is believed to eat of herbs and fruits on the new moon day to replenish his lost strength and energy, which he is supposed to regain on the full moon day. The sun never eats anything and has no need for eating any. The tree is here called Pippala and in the Bhagavadgita it is called "Aśvattha with its bottom or root turned up and its branches spread down below. In both the Tait. Aranyaka and the Bhagavadgita its branches are said to be deserving of being cut off. Continuing, the Bhagavadgita says that the Pippala or Asvattha tree with its root in the sky and its branches on the earth below has for its leaves the Vedas (Chhandāmsi yasya parṇāni). It follows therefore that the Vedas themselves constitute the tree. In other words this peculiar tree is a "Tree of Knowledge"; that the eating of the fruits of this Tree is forbidden; that one of the hoary couple commits the sin of eating of its fruit; and thus though they bring about their own downfall, they retain their function of procreating the world and perpetuating its life. As the Buddha is said to have attained to his spiritual knowledge under

the Aśvattha tree, it is still called the Bodhi-tree or tree of knowledge. Can there be any doubt that the Vedic Pippala tree with its first couple engaged in procreating the world is the same as the Biblical Tree of knowledge, under the shadow of which Adam and Eve, the first parents of the world, lived and committed the sin of eating of the forbidden fruit? Also one of the branches of the Vedas or the Vedic tree is Pippalāda-śākha. It is probable therefore that Pippala or its equivalent Asvattha was once a name of the Vedas themselves. If so, it follows that the word Bible was the name of the tree of knowledge and that it came to denote the sacred literature treating of the life of the first couple. I think that Pippal and Bible have philological affinity with each other. I think that the word Babylon can also be traced to the same source. It is to be noted that that celestial sphere itself is herein described as the Pippala or Aśvattha tree and that the world-creating couple are clearly the sun and the moon, of whom the sun (Sāvitṛī-Gāyathṛī-Sarasvatī) is female and the moon the male. In the Atharvaveda the sun is called Avi (Avirvai nāma devatā). In the later literature and also according to popular belief the moon is regarded as female. Both in the Atharvaveda and the Tait. Aranyaka doubt is frequently expressed regarding the sex of the two.

Anyhow there seems to be no doubt that originally the sun and the moon were regarded as the first parents of the world and that owing to change in their names the identity of the pair with the sun and the moon was lost.

Thus the creation of the world after their fall from their perfect divine nature on account of the eating of the forbidden fruit is one of the functions of the first parents.

Still they are regarded as Devas, angels, among the stars, the other minor Devas. The Vedas imply that there is a supreme god above them and protecting them from demons who are called Rākshasas, Yakshas, and Gandharvas. The other two functions of the parents are (1) time-making and (2) removal of darkness by vanquishing the demons of darkness, if necessary, on the occasion of eclipses. What seems to underlie the whole of the Vedic thought is the belief that the supreme god comes as *Indra*¹ to dispell drought and darkness of eclipses, or as *Krishna* pervaded with *Yasas* to rescue the parents from dark demons causing eclipses. As *Varuṇa*, He maintains the eternal law and as *Mitra*, He perpetuates light and truth. *Indra* comes during the rains year after year; *Krishna* arrives at the *Devaloka* or *Vāyuloka* and *Bhūloka* once in 20000 days (*Iyānah* *Krishṇo* *daśabhiḥ sahasraih*) or 54 years. *Dasasahasra* in the text means that on one wing. Even if we take it to be only 10000, it means a cycle of nearly 27 or 28 years. *Mitra* is the god of the day; *Varuṇa* (moon) is the god of the night. The connection of *Krishna* with the *Suparnas* of the *Pippala* tree is clearly stated in the *Atharvavedic* verse—“The *Suparnas* fly to the heaven carrying fleeting *Krishṇa* covered with water,”² (*Krishṇam* *niyānam* *harayah* *suparnāḥ* *apo* *vasānāḥ* *divamutpatanti*).

The celestial *Pippala* tree is mentioned as *Vana-spati*, lord of the forest, in the *Apri* hymn of the *Vedas*.

¹ *Indra*=*Ander* in *Alexander*, which is philologically equivalent to *Rakshasendra*. I am told that *Alexander* is traceable even to *Homer's Iliad*.

² *Apah*=*Water* is a name of rays of light which are spoken of as *Vestment* of the gods.

The Apri hymn is a description of the function of eleven primary gods who become thirty-three by appearing thrice in the course of their cycle of 33 years. The eleven gods are thus described in Tait. Brāhmana (2, 6, 18):—

(1) Well kindled Agni or Indra, as old as $1\frac{1}{2}$ years ; (in other passages Tryavi, three lambs meaning three solar eclipses is put for *Ashṭādaśamāsā vayah*).

(2) Tanūnapāth god two years old, (in other passages dityavāt Gauh, meaning one or two lunar eclipses).

(3) Īdita god, three years old, (or Trivatsa meaning three or one solar eclipse ?)

(4) Barhis god, $2\frac{1}{2}$ years old, (or Panchāvi meaning five solar eclipses).

(5) Dvāra (Entrance) god, $3\frac{1}{3}$ years old, (Turyavāt gauh, meaning one or four solar eclipses).

(6) Yahva god, 4 years old, (Pashṭhavāt gauh, meaning one or two solar eclipses.)

(7) Hotri god, as old as a bull capable of drawing a cart.

(8) Ida, Bhārati, and Sarasvati, three goddesses, as old as a cow delivered of its calf for the first time.

(9) Tvashtri god, as old as a bull.

(10) Vanaspati or forest-lord, god, as old as a barren cow.

(11) Svāhā god, as old as a well developed bull.

Here the lambs, and cows, are all solar eclipses and bulls are lunar eclipses of different digits occurring in a cycle of eclipses. The total number of years given to the

first six gods amount to $16\frac{1}{2}$ years.¹ As Indra is said in Tait. Br. 2, 6, 8 to be growing with these trice eleven or 33 gods, we may take that the age assigned to him is the same as that of the 33 year-gods. Accordingly the other five gods must necessarily have $16\frac{1}{2}$ years for their age. The White Yajurveda (21, 12-17) gives to the 5th god Dvāra 4 years and to the 6th god Yahva 6 years, thereby making the total amount to 19 years. In this case the latter five gods will have to be given only 14 years.

In other texts Ushasānakta is put in the place of the 6th god named Yahva in the passage quoted above. Ushāsānakta means day and night, that is, the day-part of the year and the night part of the year. In other words it means the Uttarāyana and the Dakṣiṇāyana. If the lunar year is not adjusted with the solar year for about 16 years, the portions of the year from the Uttarayana to the Dakṣiṇāyana and from the Dakṣiṇāyana to the Uttarāyana will be reversed, that is, the former with long days will take the place of the latter with long nights. This is what is meant by Ushasānakta the half year of long days (Ushasā) and the half year of long nights (Nakta). If the years are continued for another $16\frac{1}{2}$ years, making the total of unadjusted lunar years 33, then the lunar year will gain one year over the solar years and begin with solar year again. For 33 lunar years of 354 days each are equal to 11682 days and 32 solar years of 365 days are equal to 11680 days. The assignation of $16\frac{1}{2}$ years to six of the eleven gods, each, being triple, of the Aprihymn in terms of the age of eclipses from one to another in the course of $16\frac{1}{2}$ years in the cycle of eclipses is in itself a strong

¹ Compare Prajapathi formula of 17 syllables,—Asravaya, Astu Sraushat, Yaja, Yeyajamahe, Vausht— $4+4+2+5+2=17$.

evidence that the purpose of the Apri-hymn is the celebration of the 33 years' cycle either in the middle or at its close. There was also the custom of observing the Apri festivities at the end of 19 years instead of $16\frac{1}{2}$ years. In this case the number of unadjusted intercalary months amounts to seven instead of 6, as in the case of $16\frac{1}{2}$ years. The suns presiding over the 7 intercalary months are called 1 Dhātā, 2 Aryama, 3 Mitra, 4 Varuṇa, 5 Amśa, 6 Bhaga, 7 Indra, and 8 Vivasvan, or 1 Aroga, 2 Bhraja, 3 Paṭara, 4 Patanga, 5 Svarnara, 6 Jyotishman, 7 Vibhāsa and 8 Kaśyapa. The counting of an eighth sun or Aditya was due to observance of a cycle of 20 years with 8 intercalary months for some time in earlier days of the Vedic age. The eight suns of the eight intercalary months are called the eight sons of Aditi (Ashtau putrāso Aditeh). As this cycle of 20 years with 8 intercalary months was found imperfect, it was given up and the eighth sun called Mārāṇḍa (half born) was rejected (para mārāṇḍamāsyat) and Aditi is said to have approached the gods only with 7 sons. When 8 intercalary months were counted, the cycle was called Ashtāchakra, consisting of 8 minor cycles of $2\frac{1}{2}$ years each. This is the cycle of the celebrated Vedāṅgajyautisha. This cycle of 20 years was called Ayodhyā city of the gods having in its interior the goddess called Harini (the sun) and the god Yasas (moon?). When the number of intercalary months was reduced to seven, the cycle was reduced from 20 to 19 years. The eighth sun called Kaśyapa, though originally believed as a settled fact (ashtau tu vyavasitah), was later assigned to Meru (the Pole), a place which he is said never to leave. While 19 years of the 33 years' cycle is called the city of the gods, Devaloka,

the remaining 14 years of the cycle must necessarily be the city of Asuras, demons haunting the night part of the cycle, as contrasted with the day part of the cycle. The first part of 19 years was also called the cycle of 7 Purushas or 7 fathers and the second part of the cycle five mothers. This is evidently the source of the rule laid down by Hindu law-givers that Pitrisāpindya or consanguinity from an original father extends to seven generations and that Mātrisāpindya or consanguinity from an original mother extends to five generations. The head of the second Asura-part of the 33 years' cycle is called Kubera, the lord of Asuras, Yakshas, and Gandharvas, who are believed to frequently wage war with the gods, especially the sun and the moon, and cause eclipses. Hence Kubera is frequently prayed to for averting such calamities as eclipses and is given very rich offerings for this purpose.

It is very well known that in 19 solar years there are 228 solar months, of which 7 are intercalary months. During the Vedic times this was expressed not in terms of solar years, but in terms of a thousand days. One intercalary month seems to have been counted in 1000 days and 7 intercalary months in 7000 days which are equal to 19 solar years and 49 days. Expressions such as "A bull with thousand horns," "the wings of the Suparna are expanded for a journey of 1000 days," "the bull is one-thousandth," "this white one with four horns vomited something," clearly establish the custom of counting in terms of 1000 days in Vedic times. The Amarakosa defines a Manvantara as 71 Yugas, and a Brahma's day or night as "a thousand Yugas or 14 Manvantaras of 71 Yugas each" as already shown.

Now a thousand Parvas are equal to 14000 days, or $41\frac{2}{3}$ lunar years, or 39 solar years and 5 solar months. Again 14000 days are also equal to two Metonic cycles of 19 years each with 14 intercalary months or nearly 39 solar years and 2 months. The Rigvedic description of Indra's mother bearing him for 1000 months means the same thing¹. The maximum number of eclipses that may occur in this period of 7000 days is not more than 70 or 71. G. F. Chambers says in his "Handbook of Astronomy" that "In the 18 years cycle there usually happen 70 eclipses, of which 41 are solar and 29 lunar; in any one year the greatest number that can occur is 7 and the least 2; in the former case 5 of them may be solar and 2 lunar; in the latter case both must be solar; under no circumstances can there be more than 3 lunar eclipses in one year, and in some year there is none at all."

The use of the cycle of 700 days with 7 intercalary months among the Isrælites is also referred to by the same authority, as quoted already. It is this cycle of 7000 days that is meant by the statement made in the Tait. Aranyaka that Purusha (measuring 1000) is of 7 forms and that each of the 7 Lokas from Bhu to Vyoma measures 1000 (days). This is conclusively proved by the Rigvedic verse—"Yassambaram parvatesu kshiyantam chatvarimsyam saradyanvavindat" "He (Indra) came across Sambara living in the (seven) hills in the fortieth year." How 40th year or 39 years and some odd months (lunar) are equal to 2 Metonic cycles or 2 cycles of 7000 days each, has just been pointed out. That Sambara is an eclipse-demon of the type of Rāhu, has also been pointed out. Can there be any doubt then that the Rigverse is a

¹ Vide Wilson's Trans of the Rigveda vol: III p 154.

clear reference to the use of the Eclipse-cycle of 19 or 20 years? Can it also be doubted that the Manvantara-table of years is only an era of years counted in terms of Eclipse-cycles. Thus the frequent reference to the numbers, such as, 1000, and 33, and 7 is clearly a reference to the counting of eclipse-cycles and eclipse seasons and not at all magical numbers with no meaning or any significance. The expressions, "Tryavi," and "Panchavi" in the Apri hymn mean three solar and five solar eclipses; and the statement made in the same hymn that they give age to the gods means that the periodical eclipses indicate the number of years that have elapsed in the cycle. The custom of sacrificing a goat, or a sheep, or a cow, or a bull as appropriate to the form of eclipses witnessed seems to have been the cause of calling those months of eclipses after the animals sacrificed in those months. The cycle of 8 or 7 intercalary months is, as pointed out already, called the city of the gods with 8 circles known as *Ayodhya*, a word which is philologically akin to *Zodia*.

The seven intercalary months of the eclipse-cycle are also called "1 Bhuh, 2 Bhūvah, 3 suvah, 4 Mahah, 5 Janah, 6 Tapah, 7 Satya or Vyoma. They are also called seven Dvīpas, known as Jambu, Plaksha, Kuśa, Krauncha, Śāka, Śālmali, and Pushkara, and seven oceans, Lavaṇa, Ikshu, Surā, Sarpīh, Dadhi, and Sudhā (or Jala=water.)

The Tait. Aranyaka says that the Bhuloka contains 1000 and that the seventh Vyomaloka also contains 1000 (Sahasravritiyam bhūmih param vyoma sahasravrit). It means that the other lokas between these two Lokas also contain 1000 each. On the whole the Lokas contain

7000 days allotted to them to mark a cycle of eclipses. The period of 7 intercalary months is also called seven Purushas and the Maitrāyaṇīyasamhita says that a Purusha measures a thousand. The Tait. Ar. says that Purushas are only seven (Purushah saptavidhah). This way of counting also points to the cycle of 19 years with 7 intercalary months constituting a cycle of eclipses.

The seven intercalary months of the 19 years' cycle are also called the seven horses of the sun's chariot, seven Suparṇa birds which carry Kṛishṇa wrapped in water to heaven, seven rivers which Indra passed through ninety-nine times or ninety-nine sevenfold rivers, after slaying Vritra (Rig 1, 32, 14), seven Rishis, seven Vālakhilyas or Priśni cows, by means of which Indra broke open the Vala cave to recover the cows (Rig, 8, 41), and seven hills which Indra cut through to obtain the hidden wealth of cows or rays of light. (Rig. 8, 66, 10).

According to the Satapatha Brāhmaṇa quoted by Muir (Muir's Sanskrit Texts Vol. 5, P. 96) Indra is the sun and Vritra is the moon. Accordingly piercing through the seven hills by Indra means that the sun reached the moon after the close of seven intercalary months and that the sun and the moon were at the same place at the commencement of the new year after the cycle of 19 years. Indra's passing through ninety-nine seven-fold rivers after slaying Vritra means that he passed through 99 cycles of 19 years each, of which the seven intercalary months are termed as Vritra, a serpent of seven heads, which, if not adjusted with the solar year seven times previously, would throw back the commencement of the year from Śrāvana to Pushya and delay the arrival of the rainy season in the month of Srāvaṇa by

seven months. The passing of the sevenfold rivers ninety-nine times clearly means that there passed 99 cycles of 19 years or 1881 years from the commencement of the Vedic Era. The destruction of 99 or 100 Sambara's forts which, as pointed out elsewhere, means so many full or partial solar eclipses points to the passing of the same cycle of 19 years (or 18 years and 11 days) 99 or 100 times or 1800 or 1900 years in all. The traditional performance of 100 or 99 horse-sacrifices by kings one after another among the Indian kings points to the passing of the same number of years, namely 99×19 or $100 \times 19 = 1881$ or 1900 years in the Vedic era. Indra's title of Satakratu means that he performed 100 sacrifices of the Saptasamsthā or seven-constituents-form, each sacrifice being performed to get rid of the sin of one intercalary month. Thus Satāśvamedha, Satavritra, and satapurās of Sambara all point to the same thing and find cogent meaning which they cannot have in any other way.

Just as Indra is the main god of the 20 or 19 years cycle, so is Kubera the chief Asura-god of the remaining 13 or 14 years' cycle, which both make up a major cycle of 33 Devas or year-gods. The Tait. Aranyaka says that Kubera also has a chariot of 1000 spokes and many wheels. He is invoked to come and receive the offerings given to him for averting injuries (eclipses) by calling off his Asuras, Yaksha and Gandharva troops.

Now passing to the Hebrews and their history, it is found that they, too, were the worshippers of sun and moon and celebrated the cycle of 19 years with seven intercalary months like the Vedic Aryans. In the One Volume Bible (P. XVII, J. R. Dummelo says as follows:

"The religion, at first sight, offers a picture of hopeless confusion. Gods of the sky, gods of the earth, gods of the deep, families of gods, fathers and mothers, sons and daughters, local gods of cities, and hills, gods directing and involved in all the powers of nature, confront and bewilder us. The whole effect is a crass polytheism, full of degrading superstition; yet when we look a little closer, higher thoughts are not wanting. Looking up-wards to the sky is familiar to Orientals in a degree altogether unknown to us, the Babylonian thinkers watched the movements of the heavenly bodies and saw in them the seats of the great gods. To them the whole universe was divided into three regions. First came the northern heavens in which the pole-star burned continuously. Then the broad belt of the zodiac spanning the stars within which all the movements of the sun, moon, and planets, were confined, lastly the southern depths."

The Babylonian account of creation, the creation of apsu (water=ocean) at first, the conflict between Tiamat (Tamah) and Merodack (Mridika=Sarasvati=sun), the legend of flood, and continuous rain for 7 days—all these find their correspondences in the Vedas. The Babylonian time-table is quite similar to that of the Hindus—

10 Svaras	....	(Babylonian Sor)	....	1 Śvāsa.
6 Śvāsas	....	"	Soss	.... 1 Vinādi.
60 Vinādis	....	"		.... 1 Nādi.
60 Nādis or 21, 600 Svāsas	..	Ner	....	1 day.

Regarding the early religion of the Isrælitcs, the Cambridge Ancient History, Vol, 2 Pp. 428-9 says as follows—

"In the temple of Jerusalem there were horses of the sun with their chariots (2 Kings XXVIII, II ; c/f., XI, 16). Shamash stands on a horse in the procession of gods sculptured on the rocks at Malatia. The existence of sun-cults is confirmed elsewhere by such place-names as En (or Beth)—Shamesh, that is, well or house of the sun ; and with this agrees the early prominence of the god Shamesh (Vol. 2 P. 350 sq.) and of the symbol of the winged sun familiar in Assyria and Egypt (P. 90 cf. Mal IV, 2). Sun-worship persisted (Ez. VIII, 16), and the eastern gate of the temple was especially sacred (Ez. X, 19, XLIV, 2 sq.). The cult of the queen of heaven flourished (403) ; there are also various traces of the moon-cult, and men kissed their hand in adoration to sun and moon (Job. XXXI, 26 sq.).

In his translation of the Koran George Sale says in Note 1 on Page 165—

"The chief gods of the Arabs were the sun, moon, and stars."

The above quotations confirm the prevalence of the worship of sun and moon in Arabia and Asia Minor in ancient times. Nor are proofs wanting regarding the prevalence of eclipse-cult in those lands in the same epoch. In his Hand-book of Astronomy, (Vol. 11, PP. 464-67) F. G. Chambers says that the eclipse cycle of 19 years was in use in a more exact form in the time of the prophet Daniel. This is what he says—

"That the 2300 year cycle is the primary natural cycle for the correction of the Metonic cycle, and that it may be considered as simply an expanded Metonic cycle. Before Meton earned Athenian honours by discovering the celebrated 19-year cycle which bears his name, the

prophet Daniel had embodied in his revealed chronology the grand cycle naturally adapted to correct the error of the Metonic cycle. The use of the 19 year cycle or "golden number" is indispensable in a calendar adjusted to the months and years of nature. The slight error of that cycle (2h, 4m, 4s.) accumulates to nearly an entire day (22h, 44m) in 11 cycles of 19 years or 209 years, and to nearly 11 days (10d, 10h) in 11×11 cycles of 19 years or 2299 years, which error is balanced by 11 days epact in the 2300th year. The epact of any single year is 11 days and the 11 days excess of the lunar months above 2299 solar years in 121 Metonic cycles, becomes the epact of the 2300th year. The 2300 year cycle which is 33 times more exact than the Metonic and is the primary cycle adapted to its correction is thus the natural secular basis for a calendar correctly adjusted to solar and lunar revolution.

That the accumulated epacts of 2300 years or the difference between 2300 lunar years and the same number of solar years make up exactly 70 years and 7 months, a measure harmonious with the 7 months epact in the Metonic cycle and with the prevailing septiform character of the prophetic times. The rate of epact is remarkable as being one month in 1000 days (992d), 12 months or a lunar year in 12000 days (the 33 years Messianic cycle) and 70 times this in 2300 years."

What is to be noted in the above quotation is that long before the use of the Metonic cycle in Rome there was a cycle of 2300 years or 11 times 11 or 121 Metonic cycles in the land of Israelites, in which the error of 11 days vanished by itself by the epact of 11 days in the 2300th year; and that there was also a cycle of 1000

days with one intercalary month, a cycle of 7000 days with 7 intercalary months, and a cycle of 12000 days with 12 intercalary lunar months, which is the same as the celebrated Messianic cycle of 33 years.

It is to be borne in mind that the Metonic cycle was framed mainly for predicting the eclipses on the basis that an eclipse observed on a particular day and hour will recur exactly after 19 years, and that almost all the eclipses observed in the course of a cycle of 19 years will recur in the second cycle of 19 years, and so on. Like the Vedic people the early Arabians also seem to have called eclipses after the names of cows, goats, and sheep.

In his translation of the Koran George Sale says explaining the Title, "Cow" of chapter 11—"People who took the calf for god are found fault with. The calf is the result of the mass of gold and silver borrowed from the Egyptians and melted by Al Sameri and revived by throwing some dust from the foot-steps of the horse of the angel Gabriel." "Those who took the calf for god were slain and their number was counted variously, 3000, 23,000, or 70,000; it may be observed that the number seven, seventy, and seven hundred are frequently used by eastern writers to signify not so many precisely, but only an indefinite number, either more or lesser." Note 1, P. 191.)

I pass no remarks on the above Note except saying that the numbers do signify something and that something is, as pointed out by Chambers in the above extract, a reference to ten times 2300 years and ten times 7000 days.

Again in Note 4 on P. 229 of his translation of the Koran he says:—"The commentators say that Joseph

came to his service at 17, and lived with him 13 years, and that he was made prime-minister in the thirtythird year of his age."

This evidently is a reference to the cycle of 33 years split into 17, 13, and 3 years. The number 17 is a number sacred to Prajāpati in the Vedas, and the number 13 is identical with the number of years which Rāma, and the Pāṇḍavas are said to have spent in wilderness.

The cycle of 33 years is more clearly referred to in the Koran in Chat. XVIII devoted to the description of "The Cave." This is what the translator says on P. 234.

"This (Cave) is so called because seven sleepers concealed themselves in the Cave ;... The seven sleepers had a dog with them ; the dog was the eighth. They are said to have slept for 300 and 9 years. Jallaloddin supposes that the whole space was three hundred solar years and the odd nine years are added to reduce them to lunar years.

Clearly the seven sleepers are the gods of seven intercalary months of the 19 years cycle, and the eighth dog corresponds to Martāṇḍa, the eighth son of Aditi, cast out as excessive ; and the nine years in the course of 300 solar years implies the cycle of 33 lunar years equivalent to 32 solar years, with one intercalary year in 32 solar years. In a hundred years there are three cycles of 33 years, and in three hundred years 9 cycles of 33 years ; as there is an intercalary year of 12 lunar months in every cycle of 33 years, there are 9 intercalary years in 9 cycles of 33 years each or 300 years.

This confirms the prevalence of the cycle of 33 years which, as already pointed out, is subdivided into two

minor cycles of 19 years with 7 intercalary months personified as Purushas, and 14 years with 5 intercalary months, among the early Arrians.

The use of the 33 years cycle and of the cycle of 7 intercalary months and its multiple, 2300 years among the Israelites is clearly pointed out by Chambers in the extract quoted above. The prophecy of the arrival of Christ with 7 Persons and 8 princes in Chapter V, Micah, seems to be a reference to the seven intercalary months personified as Shepherds; for Krishna (—Christ) is said in the Vedas to arrive periodically once in every 20000 days to release the sun from the clutches of the eclipse demon, and 20000 days are nearly equal to 3 cycles of 19 years with 3 intercalary periods 7 months each.

Belief in seven heavens corresponding to the seven Lokas, Dvīpas, and Oceans, of the Vedas is also referred to in the Koran:—George Sale says in Note 5 on p. 301 of his translation of the Koran, "He is now alive in one of the seven heavens or the Paradise." In Note 3 on Page 318 he says—"They (the heavens) were one continuous matter, till we separated them and divided them into seven heavens and the earth into as many stories."

In the text of Koran itself seven heavens are thus referred to—(xxiii, P. 336 Trans.)—"And we have created over you seven heavens."

As the head of Asuras, Yakshas, and Gandharvas, Kubera is the controller of eclipses which are believed to be caused by the Asuras. Accordingly Kubera's land is the land of Manu, a word meaning 70 or 71 eclipses occurring in an eclipse-cycle of 19 years. The eclipse-cycle itself is called Devaloka. The Tait. Aranyaka says that when there is famine in Devaloka, there is

plenty of water in Kuberaloka, or Manuloka, as it is called. This means that when the lunar year is not adjusted with the solar year for 19 years, the beginning of the lunar year falls back by 7 months from the month of Srāvaṇa in the rainy season, and consequently there is drought for seven months in the land where this cycle of 19 years is observed. In the Kuberaloka in the other parts of the globe there is plenty of water. Accordingly people from Devaloka will migrate to the Kuberaloka to avoid the miseries of famine. This reminds us of the Biblical story of the Chosen people migrating to the land of Phero (Bera in the word, Kubera). The slaughter of the first-born in the land of Kubera (Phero) is also hinted at in the Tait. Araṇyaka. (1, 23, 9). Prajāpati, the moon, is stated to say that he will pervade the whole universe and will be born as the first-born of Rita, the night part of the year from summer-solstice to winter-solstice. The Brihadāraṇyaka says (5, 4) that Prajāpati (moon) will also be born as the first born of Satya, the day part of the year from wintersolstice to the summer-solstice. The disappearance of the moon on the day of new moon is described in the Vedas as his Ātmāmbhāna, self-sacrifice, and his appearance on the first day of the white half of the year is his rebirth as the first-born. Prajāpati is also called Brahma (Ebrahim of the Bible).

In 1, 31 the Tait. Ar. contains a verse in which Kubera called Vaiśravaṇa is said to have disappeared under water, (Adbhyah tirodhā ajāyata). He (Kubera = Phero) is prayed to cause the disappearance of enemies.

The instructions given by the teacher to the student in the Tait. Araṇyaka 7, 11 reminds us of the ten Commandments of the Holy Bible.

view. . Whatever might be the answer, there are the words thrusting themselves upon the attention of all for consideration and interpretation.

SUNASIRA

OR

SIRIUS IN CANIS MAJOR.

In the Rigveda (10, 101) and also in the Atharvaveda (3, 17) there is a hymn addressed to Śunāsīra and recited while ploughing the fields for sowing seeds during the summer rains. The hymn runs as follows:—

सीरा युञ्जन्ति कवयः युगा वितन्वते पृथक् ।	
धीरा देवेषु सुम्नुयुः ॥	1
युनक्ता सीरा वियुगा तनोत कृते योनौ वपतेह बीजम् ।	
विराजः स्नुष्टिः सभरा असन्नो नेदीय इत् सृण्यः पक्वमायवन् ॥	2
लांगलं पीवरवत् सुशीमं सोमसत्सरु ।	
उदिद्वपतु गामर्वि प्रस्थावत् रथवाहनं पीवरीं च प्रफर्त्यम् ॥	3
इन्द्रस्तीतां निगृह्णातु तां पूषामिरक्षतु ।	
सा नः पयस्वती दुहमुत्तरां समाम् ॥	4
शुनं सुफाला वितुदन्तु भूमिं शुनं कीनाश अनुयन्तु वाहान् ।	
शुनासीरा हविषा तोशमाना सुपिप्पला ओषधिः कर्तमस्मै ॥	5
शुनं वाहा शुनं नरः शुनं कृषतु लाङ्गलम् ।	
शुनं वरत्रा बध्यन्तां शुनमष्टामुदिङ्गय ॥	6
शुनासीरेह स्म मे जुषेथम् ।	
यद्विवि चक्रतुः पयस्तेनेमामुदसिञ्चतु ॥	7
सीते वन्दामहे त्वामर्वाचि सुभगे भव ।	
यथा नः सुमना असौ यथा नः सुफला भुवः ॥	8
घृतेन सीम मधुना समक्ता विश्वैर्देवैरनुमता मरुद्भिः ।	
सा नः सीते पयसाभ्यावधृत्स्थोर्जस्वती धृतवत् पिन्वमाना ॥	9

May Śunāsīrā be pleased with us and may they wet
the earth with
The water which they make in heaven. 7
We bow down to thee, O Plough-share, turn to
us so as to make us
Happy and render our fields fruitful. 8
The furrow anointed with ghee, with honey,
approved by the all-gods
And the Maruts ; O Plough-share, return to us
flowing 9
With milk, ghee, and strength to us.

The chief point to be noted in this hymn is the prayer to the two gods, Śuna and Śīrā for good showers of rain so as to ensure a rich harvest. Śīrā as the name of a plough-share is well known and according to the Amarakośa Śunī is synonymous with Saramā, a dog. In the Vedas Saramā is a dog of four eyes kept by Yama, the god of the departed. Śuna, masculine of Śunī is, however, rare in classical Sanskrit. The form of 'Sun' appears in accusative plural, in the singular of instrumental, dative, ablative cases, in all the numbers of the possessive case and in the singular and dual of the locative case of the word "Śvan," a dog. In the Tait. S. 7, 4, 15 the word Suna is used meaning a dog. Dr. Keith noted the word in his Notes on this passage. This Mantra is recited while slaying a dog along with the horse in the Horse-sacrifice. Accordingly we may take that Suna was a Vedic masculine form of Śunī, a bitch.

In the prayer addressed to Śunāsīra the word Śuna is used seven times, and the commentators take them all to mean "so as to cause happiness, or for good." I followed them in my translation of the hymn. It may,

however, be taken in the sense of a dog and the passages may be rendered as follows:—

May the plough maul the dog; cleave the ground as well as the dog; and may the ploughers follow the bullocks.

May the bullocks, and the ploughers plough the dog (buried under the ground), may the plough cleave the dog; and may the whip drive the dog (in front of the plough for being killed).

The custom of killing a dog and burying it in the field to avert drought and ensure good showers of rain is still prevalent in some parts of India. Accordingly we may take the word "Sunāsira" to mean the dog-star "Sirius" in the constellation of Canis Major. In Chapter 3, Vol. 7 of "Museum of Science and Art," Sirius is taken as an Oriental word imported into Europe by the Arabs. This is what the learned writer says in the Museum of Science and Art.

"In almanacks generally the 3rd July and the 11th August are indicated as the first and last of Dog Days. This comprises an interval of forty days, which is generally the hottest part of the summer. In the time of the ancient astronomers of Egypt and Greece, the position of the equinoctial points and the tropics which determine the limits of the seasons was different from what is at present, and was such, that a remarkable star called Sirius, in the constellation called Canis Major or the "great dog" rose in the mornings immediately before the sun during the month of July, of which it was considered the harbinger and whose calorific power was imagined to be increased by its influence. The idea that this star, the Dogstar as it was called, exercised

such an influence, was no doubt countenanced by its extraordinary splendour, being by far the most brilliant of the stars visible in the northern hemisphere. The days, therefore, during which the star ushered in the sun, and led as it were, his way through the heavens, were called Canicular days or Dog days. The prevalence of canine madness at this season may also have had something to do with the name of dog days, or even with name of the constellation to which the star in question belongs." Regarding the names of the stars it is stated in the same book (P. 154) "that the principal stars of the constellation, besides being indicated by the Greek letters, are also designated by certain proper names, mostly of Arabic or of Oriental origin.....Thus for example, the most splendid star in the constellation of Canis Major or the Greater Dog, instead of being called a Canis Majoris, which would be its name in the nomenclature of the constellations, is almost invariably called Sirius. In the same manner, the principal star of the constellation Leo, is always called Regulus and never a Leonis."

Accordingly I think that it is not far-fetched to connect the word "Sirius" with "Sīrā", a plough. The plough-like appearance of "Canis Major and Canis Minor" seems to be the cause of the origin of such a name. Sunāsīra is also a name of Indra, the God of rains and eclipses.

Now according to the Vedāṅgajyautisha the Vedic year ended with the new moon of Ashāḍha and the new year began with Śrāvaṇa, the summer solstice being situated in the middle of Āśleṣha and the winter solstice in the Dhanishṭha. According to Baudhāyana these were the two points of the commencement of the sun's southern

and northern movements, when sacrifices were performed. It was at this time that the lunar year was adjusted with the solar year by adding as many intercalary months as were due, from one to seven at the most. It is this adjustment that is symbolised by the Pravargya rite. In the Pravargya rite the main purpose is to rejoin the head of the sacrifice which was cut off. It is also called the head of Rudra (Tait. Ar. 1, 5) or the head of Vishṇu, cut off by the bow, when its string was gnawed down by white ants. The words "Dhanus", and "Jyā" are in the Hindu astronomy names of the sides of a spherical triangle and Sines, as already pointed out. The origin of these names seems to lie in these sacrificial terminology of the Vedic writers. What is, however, to be understood by the breaking of the string and the heads of either Rudra or Vishṇu cut off is this. If the sun and the moon on the new moon day are not found either at the middle of Aslesha or at Dhanishṭhā on the summer and winter solstices respectively, then evidently their head is not at the expected places, nor is the semicircle marked by the 13½ constellations from Ardhāslesha to Dhanishṭha perfect. This is all that is meant by the stretching of the bow due to its string cut off. Another explanation of the cutting of Rudra's bow-string has already been given. Hence the sacrificers wait for as many months as are necessary to have the sun and the moon at the expected points and spend the time in performing the Head-replacing rite. The head is also called "Makha's head", Makha meaning a sacrifice as well as a constellation of that name in Leo. The Tait. Ar. 5, 6 makes the *seasons* also the head of sacrifice. It follows therefore that the summer solstice was once in the constellation of Makha and the winter solstice in that of Bhādrapada.

It is very well known that Sirius marks the commencement of the Sign Cancer and the last day of its rising for 40 days terminates with Makha in Leo. This confirms the conclusions of the Late Dr. H. Jacobi that the Vedic year began with summer solstice in the rainy season in Makha or the Phalgunis and that the winter solstice was in the Bhadrapadas, thereby indicating the Vedic age to lie somewhere from 4500 B.C. to 2500 B.C.



CHRONOLOGY OF THE VEDAS

An indisputable proof of the commencement of the Vedic age at B.C. 3101 is furnished by the Adhisamvatsara cycle of 33 lunar years called thirtythree gods. Rig. x 190, 1-3 says that the Adhisamvatsara arose from Samudra and that at the close of the cycle Dhātār (the first of the seven Adityas) set the sun and the moon aright as before. This means that the sun and the moon were made to begin their race as they did before at the commencement of the expired cycle or Kalpa (of 7000 days or 12000 days). As already pointed out Samudra is a name given to the cycle of 1000 days with one intercalary month and the number of Samudras is seven. The seven intercalary months of the 19 years' cycle with the five intercalary months of the 14 years' cycle make an Adhisamvatsara of 33 years, called after the deities

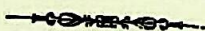
presiding over them. The era of 33 years is counted in terms of gods. The total number of gods recorded in the Sukla Yajurveda is 3336, while in the Tait. Brāhmaṇa the same runs up to 3339. Changing the number of year-gods in the Vedic text in accordance with advance of the years is not regarded as tampering with the Vedic text; for such changes under the term "Uha" are permitted. As pointed out in my "Drapsa: the Vedic Cycle of Eclipses" Aryabhata, the celebrated astronomer of India, placed the beginning of the 60 years' cycle in B.C. 3101 by saying that when he was 23 years old (in A.D. 500) the 60 years' cycle completed its sixtieth revolution. Accordingly the era of the Adhisamvatsara cycle must necessarily be given its start from the same point, that is, 3101 B. C. Accordingly 3339 gods imply A.D. 238-239 counted from B.C. 3101.

While the sixty years' cycle was current during the time of Aryabhata in A.D. 500 and is still current under the name of "Brāhaspatyabda," the era of Adhisamvatsara, evidently an era of the priests, seems to have come to a stop at A.D. 238-9. It must be noted that what is called the Kali era is the same as the sixty years' cycle.

Another Vedic era that was current side by side with the above two eras is the era of Manvantaras. According to the Amarakosa a Manvantara is a cycle of 71 Yugas and according to the Siddhāntas it is a cycle of 72 Yugas. As pointed out in the Drapsa a Yuga is a Parva of 14 days, terminating with a new moon or full moon with an eclipse. Since in a cycle of 19 years there are 72 eclipses, 42 solar and 30 lunar, a Manvantara means a cycle of 19 years.

Indian writers of all shades of thought are unanimous in stating that there had elapsed 12000 Yugas counted in terms of Kritā, Tretā, Dvāpara, and Kali. Though these Yugas are interpreted by them all to mean 4320000 years (12000×360), there is overwhelming evidence, as pointed out in the Drapsa and also in this book, to say that these 12000 Yugas are 12000 Parvas with eclipses, solar and lunar. Accordingly dividing it by 72 and multiplying the quotient by 19, we have $\frac{12000}{72} \times 19 = 3166\frac{2}{3}$ years. This is the number of years that have elapsed from B.C. 3101 to A.D. 65-66.

This, I firmly believe is the rational meaning of the Manvantara cycle and also of the Adhisamvatsara cycle. If it is so, it settles the chronology of the Vedas once for all.



APPENDIX I.

TABLE OF ECLIPSE-CYCLE OF 58 YEARS MINUS 41 DAYS.*

Solar eclipses					Lunar eclipses			
Year	A.N.† Degree	Days§	D.N.‡ Degree	Days	A.N.† Degree	Days§	D.N.‡ Degree	Days
A.D.								
1	359.38	-264.9	183.41	87.7v	14.72	250.1	168.07	102.4v
2	351.38	.254v	175.36	76.8	6.67	239.2v	190.70	102.1
3	343.29	-243.1	167.32	65.9	358.63	228.3v	182.65	62
	13.96	213.6	197.99	36.4				51.1v
4	5.92	202.7	198.94	25.5v	350.58	-217.4	174.60	40.2v
5	357.87	191.8v	181.89	14.6v	13.21	177	189.18	-354.2
							166.56	29.3
6	349.83	180.9v	173.85	3.7	5.16	166.1v	181.14	343.3v
			166.81	-358.1				
			196.47	328.6v				
7	341.78	169.9v	188.43	317.7v	357.11	155.2v	173.09	-332.4v
	12.45	140.5						
8	4.40	129.5	180.38	306.8v	349.07	144.3v	165.04	-321.5
9	356.60	118.7v	172.33	-295.9	11.69	103.9	187.67	281.1v
10	348.31	107.8	164.29	-285	3.65	93v	179.62	270.2
	18.98	78.3	194.96	255.4v				
11	340.26	96.9	186.91	-244.5v	355.60	82.1v	171.58	-259.3v
	10.94	67.4						
12	2.39	56.5v	178.87	-233.7	347.55	71.2	194.20	218.9
13	354.74	45.6v	170.82	-222.8	10.18	30.8v	186.16	208v
14	346.79	34.7v	162.77	211.9	354.09	9	178.11	197.1v
	17.47	5.2	193.44	182.3	2.13	19.9v		
	9.4	-359.5						
15	1.38	348.6	185.39	171.5v	346.04	-363.4	170.06	186.2v
16	353.33	-337.7v	177.35	160.6v	8.66	323v	192.69	145.8
17	345.28	-326.8	169.31	149.7	0.62	312.1	184.64	134.9v
	15.95	297.3	199.98	120.1				

* To face Page 26.

† Ascending Node.

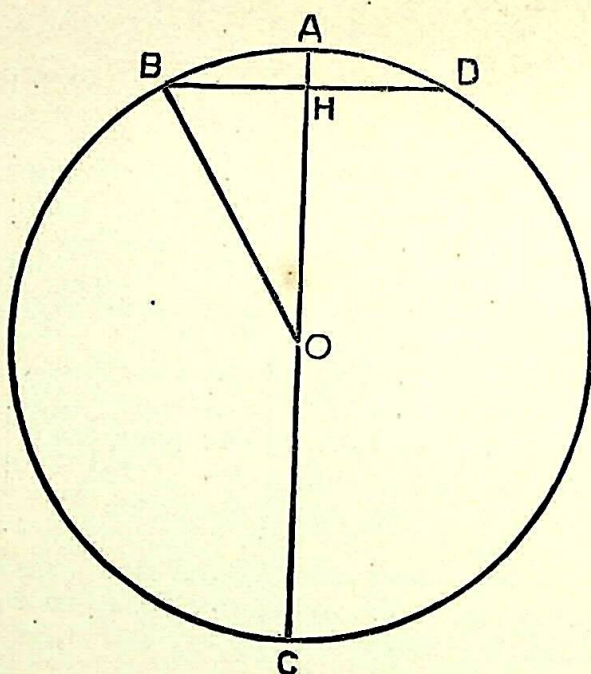
‡ Descending Node.

§ Days of Hindu Solar year which began on the 13th March in the first Century, A.D.

Solar eclipses					Lunar eclipses			
Year	A.N. Degree	Days	A.N. Degree	Days	A.N. Degree	Days	D.N. Degree	Days
18	7.91	286.4	161.26	138.8	352.57	301.2v	178.59	124v
			191.93	109.2v				
19	359.9	-275.6v	183.88	98.4v	15.2	260.8	168.55	113.1v
20	351.92	-264.6v	175.84	87.5v	7.15	249.9v	191.17	72.7v
21	343.77	-253.7v	167.79	76.6	359.10	239v	183.13	61.8v
	14.44	224.2	198.45	47				
22	6.30	213.3	190.42	36.1v	351.06	-228.1v	175.08	50.9v
23	358.35	202.5	182.27	25.6	13.68	187.9	167.03	40
							189.66	-364.9v
24	350.30	191.5v	174.32	14.4	5.64	176.7v	173.37	-354v
			196.95	339.2				
25	342.25	180.6v	166.28	3.5	357.59	165.9v	173.57	-343.1v
	12.93	151.1	188.90	328.3v				
26	4.88	140.2	180.86	317.4v	349.54	155v	168.52	-352.2
27	356.83	129.3v	172.31	-306.6	12.17	114.6	188.15	291.9v
28	348.8	118.4v	164.76	-295.6	4.12	103.7v	180.1	280.9v
	19.46	88.9	195.43	266.1				
29	340.74	107.5	187.39	255.2v	356.08	92.8v	172.06	-270v
	11.41	78						
30	3.36	67.1v	179.34	-244.3v	343.03	81.9v	194.68	229.6
31	355.32	56.2v	171.29	-233.4	10.65	41.5v	186.62	218.7v
32	347.27	45.4v	163.25	-222.5	2.61	30.6v	178.58	207.8v
33	1.35	-359.3v	185.37	182.1v	346.42	8.8	170.54	196.9v
	9.90	4.9			354.56	19.7v		
34	353.8	-348.4	177.83	171.2v	9.14	333.6v	193.16	156.5
35	345.76	-337.5v	169.79	160.3	1.09	322.8v	185.12	145.6v
	16.43	308	200.45	130.8				
36	8.38	297.1	161.74	149.4	353.05	-311.9v	177.07	131.7v
			192.41	119v				
37	0.34	286.2v	184.36	109v	345	-301	169.03	123.8v
38	352.29	-275.3	176.31	98.1v	7.63	260.6v	191.65	83.4
39	344.25	-264.4v	168.27	87.8	359.58	249.7v	183.6	72.5
	14.92	234.9	198.94	57.7				
40	6.87	224	160.22	76.4	351.53	-238.8v	175.56	61.6v
			190.89	46.8				

Solar eclipses					Lunar eclipses			
Year	A.N Degree	Days	A.N. Degree	Days	A.N. Degree	Days	D.N. Degree	Days
41	358.82	-213.1v	182.85	35.9v	14.16	198.4	167.51	50.7
							190.14	10.3v
42	350.78	202.2v	174.30	25	6.11	187.5v	182.09	-364.7v
			197.43	349.9v				
43	342.73	191.3	166.75	14.1	358.07	176.6v	174.04	-353.7v
	13.4	161.8	189.38	339v				
44	5.36	150.9	181.34	328.1	350.02	165.7	165.99	-342.9
45	357.3	140v	173.29	-317.2	12.64	125.2	188.63	302.4v
46	349.26	129.1v	165.24	-306.3	4.6	114.4v	130.57	291.5v
	19.93	99.6	195.91	276.8v				
47	341.22	118.2	187.86	265.9	356.55	103.5v	172.53	-280.6v
	11.89	87.7						
48	3.84	77.8v	179.32	-255v	348.51	93.6v	195.15	240.2
49	355.80	66.9v	171.77	-244.1	11.13	52.1v	187.11	229.3v
50	347.75	56v	163.73	-235.5	3.08	41.2	179.06	218.4v
	18.42	20.5	194.40	203.7				
51	10.37	15.6	186.35	192.8v	355.04	30.4v	171.02	-207.5v
52	354.28	-359.1v	178.3	181.9	346.99	19.5	193.64	167.1
	2.33	4.7v			9.61	344.3v		
53	346.24	-348.1v	170.26	171			185.59	156.2v
	16.91	318.7			1.57	333.4v		
54	8.86	307.8	162.21	160.1	353.52	-322.5v	177.5	145.3v
			192.88	130.6v				
55	0.81	296.9	184.84	119.7v	345.48	-311.6	169.5	134.5v
56	352.77	-286v	176.72	108.8v	8.10	271.2v	192.13	194
57	344.7	-275.1	168.74	97.9	0.06	260.3v	184.08	82.1v
	15.39	245.5	199.42	68.4				
58	7.35	234.7	160.7	87	352.01	249.4v	176.03	72.2v
			191.37	57.5v				

APPENDIX II.



This is to face page 67

- ABCD=Circle
- O=Centre
- BD or DB=Jyā
- AH=Śara
- AHOE=Diameter
- OB=Radius
- ABH=Spherical triangle
- AB=Part of the ecliptic
- BH=Moon's orbit
- B=A node, Vishnu's head
- D=D. Node, Rudra's head.

ERRATA

Page	Line	Incorrect	Correct
40	29	Sahasrātna	Sahasrāṇṇā
53	10	therto	thereto
58	12	fealing	feeling
58	30	clearnce	clearance
59	25	begining	beginning
60	3	Eclipse	Eclipses
60	7	Eclipse	Eclipses
60	15	days	day
60	11	snn	sun
60	14	descriptive	descriptive
64	30	clearnce	the clearance
65	24	how	bow
67	21	equal	equal
67	23	the half	half the
68	1	sara	the śara
68	16	nill	nil
68	22	phenonena	phenomena
70	19	gradlly	gradually
70	26	indentified	identified
71	8	chyavna	chyavana
72	9	Brnhman	Brāhmaṇa
73	21	disapearace	disappearance
73	29	horizen	horizon
74	10	horizan	horizon
77	9	berween	between
80	15	beginnig	beginning
81	3	purannic	puranic
81	28	assignes	assigns
82	19	chariet	chariot
82	25	dody	body
85	15	Chrischianity	Christianity
85	15	Mahamadanism	Muhammadanism
86	5	cousisting	consisting
87	18	clarified	clarified
91	3	eieven	eleven
93	18	Mārāṇḍa	Mārtāṇḍa
95	17	700 days	7000 days
96	4	refrence	reference
96	22	Bhuh	Bhūh
96	22	Bhūvah	Bhuvah
103	10	chal	chap

SOME OPINIONS ON THE "DRAPSA"

In his letter dated 6th May, 1938, Dr. L. D. BARNETT says—

"It is a work of extraordinary learning and ingenuity, which I am sure will throw light on some obscurities in the Vedic texts."

*In his letter dated Zurich (Switzerland), 5—1—39,
Dr. E. ABEGG Says—*

"I have received your new book on Drapsa, the Vedic Cycle of Eclipses, which I have read with the highest interest. Hitherto I knew you only as the famous discoverer and editor of the Kautiliya Arthaśāstra, the text of which I have treated with my students several times. Now I see with admiration that you are also a thorough scholar in the difficult problems of Vedic astronomy and calendar, things of which European Indianists have very rarely a true knowledge."

*In his another letter dated Zurich 15th Feb. '39
the same Professor says—*

"I shall be glad to making students of Sanskrit acquainted with them; one of the two copies (of Drapsa) will be forwarded to the University Library of Zurich."

The Bombay Chronicle, June 26, 1938 :—

"He has undoubtedly made a strong case for his new theory, a result of 30 years prolonged research and contemplation—which will call for the most careful investigation by those who are experts in the obscure field of Vedic astronomy. The author deserves our commendation for his valuable contribution to the Vedic literature."

